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JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL,

EDITED BY

THE SECRETARIES.

VOL. XIX.

Nos. I. TO VII.—1850.

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"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of *Asia* will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted; and it will die away if they shall entirely cease."—SIR WM. JONES.

CALCUTTA:

PRINTED BY J. THOMAS, BAPTIST MISSION PRESS.

1851.

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ASIATIC SOCIETY.

JANUARY, 1850.

Some conjectures on the progress of the Brâhminical Conquerors of India. By Henry Torrens, *B. A., V. P. and late Secy. As. Soc. of Bengal.*

In the grave pages of a scientific journal, so often honoured by the successes of positive antiquarian discovery, it may seem at first sight, somewhat idle to obtrude conjectural speculation, or something nigh akin to it. Where, however, he who dares to conjecture, does not go the length of insistance upon the verity of his suggestions; but is willing to incur the discredit of failure in his position, for the chance of having been able to open a new road to enquiry, the boldness of the attempt may perhaps justify its publication, however faint the hope of any ultimate solid advantage.

But in truth it will be I think, found, that the progress of discovery up to this time in that anomalous field of Indian antiquity in which neither legible monument, nor written record lend their assistance to the student, has hitherto depended a good deal upon happy supposition, directing the course of subsequent enquiry, leading to a definite consequence: as in the Indo-arian researches, we see the suggestion and first discovery with Prinsep, the investigation with Lassen, the result deduced by Wilson. I think, and have for some years thought, that we stand on the margin of a still broader field of historic knowledge, such as shall carry us from studying the mere despotic successions of princes, to an accurate acquaintance with the progress of peoples, and an approximation in due course to the solution of that great mystery, the dispersion and subdivision of the races of mankind. The

differences and yet the co-existant affinities of those races constitute one of the strangest, and most interesting subjects of human study. Identity exists among them, in the radical formation of language, with a total variance of custom; while in another case, custom and apparent habits are identical, with a difference of the very system of speech, irreconcileable as yet by any current theories in philology. The most striking of these instances, is perhaps, that of the ancient Egyptians, and the modern Hindoos, whose affinity of customs is indisputable, even to the institution of castes, and segregation; whose distinctive dress is precisely similar;—whose symbolic representations of deities in many instances correspond wonderfully; and who indeed to any one that looks observingly on the memorials of the extinct nation, while residing among the extant one, present in their modes and habits of life, of labour,—the shape of tools, boats, and utensils, and a hundred minutiæ of fact speaking to the eye, but tedious and trifling to detail, the appearance of one people. But if between two races that reckon the periods of their substantive existence, not by centuries but by milliads, there still abide in the one that lives, after the contingent influences of so many revolutions, so striking a resemblance to that one which nationally exists no more how much greater must not that similarity have been in times when both flourished, powerful and independent, at a period long anterior to the records of written history, in contemporaneous greatness? Now if on the one hand, the Egyptian hath left us (save in the *papyri* the examination of which is in its infancy) no historical record of himself beyond what lie in temples and in tombs, with their remains of art, their pictures, and their half-read hieroglyphics,—so on the other does the Hindoo, with an extant literature, vouchsafe us little or nothing of the definitely historical, amid much acute philosophy, much gorgeous poetry, mystical and imaginative theology, and legislation of a singular wisdom, fitted only for a highly civilized people. But, on either hand, meagre though to the historical interest of the lists of Egyptian kings, and all apocryphal the romance of Hindoo heroic poetry, we have fortunately preserved with each the representation of a people, whom chronology helps us in setting juxta-posed in the zenith of their power at corresponding periods. If then after a lapse, say, of two thousand years, the one race still be similar to that other which exists no more, while its records of things done anterior to that time, prove usages and

habits, almost identical with those that constituted the painted records of the extinct people,—we may with justice speculate upon an earlier time that saw the common origin of both.

It was in making some cursory enquiry into the early military history of nations, that I gradually accustomed my mind to admit the possible truth of a speculation, which I had inclined towards some years previously, regarding the eastern tributaries (recognizable as such by the animals and offerings they bring) represented in the Egyptian kings' tombs of the eighteenth dynasty.* The early mythic fable of the Indian expedition of the Egyptian Bacchus; the history of Rama† with its Bacchic character which so struck Bishop Heber, when first he saw it represented in action,‡—the visible affinities of custom, the similarity of religious types, the painted caves rivalling the graphic picture-records of Egypt,—all stimulate a dweller in India, at all interested in searching for the material of history, to approximate to some idea of the point of annexation, at which the Egyptian and the Indian element in it give evidence of union. But it has been exceedingly difficult to devise up to this time the direction, in which that possibility of union is to be looked for. The opinion that "there is no other people of the ancient world whose form and fashion bear so strongly the impress of locality as the Egyptian; or who is bound to his country by so many ties, or who so identified it with himself,"§—was all which had distributed itself very largely: its learned and sagacious propounder maintained as late as the year 1826‖ that the dominant Egyptian castes, were descended from an aboriginal African people, with a curious disregard of the internal evidence of their institution as pointing to a different origin: and the idea of a maritime intercourse with India, founded on the known facts as to the external commerce

* Wilkinson's Manners and Customs, Vol. I. *in loc.*

† An old Egyptian word. "*Pyramid* is according to him (Ignazio di Rossi) PERAM, 'the high.' The root *ram* for high, similar with the Semitic, is assured; *rama* for high seems also to have warrant. The pronounciation of the article is as with the *pi-rômis* of Herodotus for *pe-rômi*, the man." Bunsen's Ægypt's Place. Book II. Sec. VI. (a note is appended to this in the original with a cloud of philological authorities).—H. T.

‡ Heber's Journal *in loc.*

§ Heeren's Researches, Vol. V. ch. 1.

‖ Bunsen's Egypt's Place. B. I. Sect. III. B. VII.

of Egypt, and her ancient ports, as Philoteras (Wilkinson's M. and C. ch. III.) might, in this sense account for the Hindu analogies; nay, the passage* in George Syncellus upon the 40th king in his list, Amenophthis ("who is the Vocal Stone. *The Æthiopians came from the Indus, and settled in Egypt;*") would go with many who adopted Heeren's view as proof positive, in the absence of a thoroughly critical examination of the records, historical, traditional, and chronological, of the ancient kingdoms of Egypt.

It so happened that in 1846, a position was put forth in a treatise on military history, published anonymously and obscurely enough by me in Calcutta, maintaining the Egyptians, to have been the original instructors and civilizers of Europe. This idea combated the view taken of them as respects the peculiar "impress of their locality," and was entertained after mature reflection upon consideration that their monuments show them to have been great and mighty conquerors, that they also bore testimony to their progress in art and science, and that art goes forth with arms, the study of which is one of the first historical characteristics with an energetic and enterprising people. After quoting Saxe's† well-known comment on discipline, it was observed —"the nations of antiquity who derived their military system directly from Egypt, imbibed this great principle together with the rules of practice which their leaders, or their founders carried away from the land, which was truly the focus of all western civilization. These

* "I have represented the Egyptians as an aboriginal people of Africa, and as descended from the same race as the present inhabitants of Nubia. This race insensibly spread itself by colonies along the valley of the Nile into Lower Egypt. I have confined this assertion, however, to the superior castes of priests and warriors; since it appears, according to the relations of the Egyptians themselves, that it was a sacerdotal caste, emigrated from Meroë, which, by the aid of its religion and superior intelligence, founded a dominion over the Nomad tribes, the primitive inhabitants of Egypt. Such is also the opinion of Rosellini, although he does not mention Meroë, but only cites the generic name of Ethiopia. I shall show, a little further on, that Champollion also held the same opinion, which is still further strengthened by the statements of other travellers quoted in my work." Heeren's Res. Vol. V. Appendix XI. Sec. I.

† The statements of this Byzantine chronologer, with those of his predecessors Theophilus, Panodorus, and Anianus, are critically examined by Bunsen in his "Egypt's Place." B. I. Sec. II. D. E. F. G.—H. T.

nations were the Phœnicians; and through them the Carthaginians; the Hebrews; the Greeks generally; the Etruscans and through them the Romans. As to other nations more ancient than these, who may indirectly have either participated with the Egyptians in their knowledge of the science of war, or have gained experience of it by subsequent collision with them, we shall have hereafter a few brief words to say, more however in the way of speculation than enquiry."

To this position was added, another elicited in the course of an investigation, into the history of the use of the horse, an animal of eastern origin as now acknowledged by all naturalists; the antiquity of the use of this creature in Arabia was established,* *chronologically*, by the dates (2337 and 2136 B. C.) given on astronomical calculation to the book of Job; and *historically*, at a period perhaps anterior to any extant conventional base for calculation, by reference to the Hymarite rock inscriptions, found in the old seats of the tribe of Aws in Hadramaut by Lieut. Welsted (A. D. 1843), and translated by the Rev. C. Forster.† Now as Wilkinson, "the trustworthy and accurate," as Chevalier Bunsen calls him, gave for the era of the first Egyptian king, no more than 2320 B. C., the question of comparative civilization at the period in Egypt and Arabia struck me as worth attention. On the one hand was an astronomical date assignable to the era of a people (of Uz), who had already a literature, and a knowledge, however patriarchal, of the arts;—and beside it, an historical record of unknown antiquity, descriptive of the private life and military habits of a race, greatly advanced in the luxuries of the one, and the experience of the other. On the contrary it was set, on the authority of Josephus,‡ a date for the existence of the oldest known founder of Egyptian civilization, posterior to that of Job. Without skill, or opportunity in this country, to examine further, I could only judge inferentially from the facts before me, and, in showing the futility of Col. Hamilton Smith's position that the *Hyksos*, or shepherd kings, brought the horse to the Egyptians, who bestowed the knowledge of him on the Arabians, I observed as follows:—

* Reveries, B. VII.

† Forster's Geography of Arabia, Vol. II.
The argument is appended, or written, without amendment of the dates.—H. T.

‡ Wilkinson, M. L. C. Vol. I. ch. II.

"If such communications existed between the two nations, how comes it that the camel, the national type-animal of Arabia, should never have found his way, into the painted records of the Egyptians, that careful and observant people? It is a most singular fact, that the camel never has yet been found pourtrayed upon any of the paintings or sculptures, extant in the Nile valley.* The native habitat of the horse was in high latitudes, thousands of miles distant from the spot in which he most appears to have been cultured: the indigenous site of the camel was in the sandy wastes of the children of Ishmael, immediately adjoining the land of Egypt. Yet are its inhabitants supposed to have transmitted the equine animal to the masters of the camel, and with all their curiosity, science and observation to have asked for, or admitted of, no return in kind? We can only conclude that the horse was brought by the original colonists of the Nile valley, a race so singularly coincident in customs and practices with the Hindus, from Central Asia, at a period beyond our power to calculate upon any date now in our possession; that another tribe or race must, about the same time, have carried the same animal into Arabia, where the nature of the country suggested, as in the case of Egypt, the manner of his use, and the purposes to which he should be applied. The one people, amid wide and open plains, and scanty pastures, rode, as became a nomad race; the other, in a low, narrow, deep, and plenteous land, pampered their steeds in stables, and yoked them to a car, a vehicle so light that two powerful horses could easily drag themselves and it, through the fat loan of the muddy country in which a mounted man would sink to his horse's locks at every stride."

It was not till about two years or more after the above was written that I received, in the German, the three first books of Chevalier Bunsen's Egypt's Place in the World's History; and it may be judged with what satisfaction I read the peroration of his first book, in which he italicises the one great result of his unparalleled research, coincident with my own humble inference.

"On a comparative view, we can have no hesitation in saying, that the investigation into mythology, as far as it has gone, determines upon a fact not less important as respects the world's history, as certainly

* Gibbon (Misc. Works) quotes Diodorus Siculus 6. III. c. 44 to prove that the camel was extant in his day as a wild animal in Arabia.—H. T.

and to the same intent, as did the dissection of (Coptic) philology. *The knowledge of God like the knowledge of language among the Egyptians has its roots in ancient Asia, in the ancient Armeno-Caucasian territory.* That this land, defined more nearly, is one of primitive Aram, and connected with the primitive kingdom in Babel,—and that the hieroglyphics of Egypt are actually nought else in the image of the world's history, than a still extant peculiarity of the old-time of Aramite-Armenian mankind (according with the same law whereby Iceland exhibits the still extant heathen Norway of the 8th century) —is an historical fact which we will here but assert, proposing to lay the proof of it before our readers in the fourth and fifth book.

"If we turn from this point to its opposite, the historical period of Egypt, our investigation into the Egyptic origines, will already have made it clear, that the kingdom of Menes itself, rests upon a venerable substructure of several centuries of the Nile valley, rich with the spirit of intellect. Conformably with it must Menes have constituted the kingdom of Egypt, in that he brought together, and united the separate elements of life of Egypt's provinces. Thus do these origins establish true, the assertion made at the opening of this book, that Menes created the historical knowledge of the Egyptians, as did Karlmagne that of the German peoples."*

Here then we have research supporting inference with such commanding weight of authority, as to encourage the resumption of ideas still more daring, than those even which suggested an eastern origin to the inhabitants of ancient Egypt, from a stock allied to the Hindu. I have not the fourth and fifth books of Chev. Bunsen's work, indeed I know not if they be published, in spite of enquiry made; but, I do not think it inexpedient to set forth once again, and, on authority corroborative of the Egyptian tomb-records, that the ancient Egyptians, an eastern people who brought into the Nile-valley the germ of civilization,—

* I have seen, and indeed possess, a translation of the first Vol. of Chev. Bunsen's Egypt by Charles Cottrell, Esq. M. A. (London 1848); but it is in a style of periphrasis, and not without omissions: I have therefore ventured on the humble verity of as literal a rendering as I could master. Should Mr. Cottrell have translated from a later edition than that of my copy (Hamburgh, 1845, octavo), which has suffered alteration, (and from the variations I should suppose so) part of my remarks do not apply.—H. T.

there perfected it, and then carried back their arms and arts as conquerors, both before and after their temporary subjection by the *Hyksos*, into the countries immediately civilized and peopled, through which they had, as nomads, passed on their way to the Nile.

It is remarkable that up to the time of the Ptolemies, the character of every monument, and of every vestige of the ancient Egyptian people retains its Egyptian type, that 'impress of locality' which so much struck Heeren; and as this type has from the earliest, been unmixed by analogy with that of any other nation, save the Hindu, the necessary conclusion is that the Egyptians in their migration towards the Nile traversed virgin lands, as yet unsettled and uninhabited. According to the great law which seems to regulate the progress of people from land to land, that progression is impulsive, the foremost tribe being forced forward by that which directly infringes upon it. This may happen in three ways;—by the strong hand, driving a race of previous settlers from their homes to the masterful advantage of the aggressor, who has perhaps himself been forced upon them;—or by the two supposed cases of incompatibility of co-existence in races whose capacities for accepting civilization materially differ; viz. either when the foremost race being of peaceful habits, industrious and quiescent, becomes dissatified with the neighbourhood of a people, which, though not unfriendly, is inapt to mix or to deal with its denizens on equal terms;—or where the converse occurs, the foremost nation being slothful, inert, uninventive, and capable of only a semi-savage independence, refusing and ultimately withdrawing from the offence of the civilization superincumbent over it, in the institutions of the nation that has immediately followed it up.* It is probable then that the shepherds, i. e. the Nomad races, had been "an abomination unto the Egyptians" from times anterior to their settlement in the Nile-valley,—at a period how remote the newly-established chrono-

* The disappearance of the pure Celtic races, in our isles before Saxon influences is a melancholy extant example of this latter phenomenon in the history of mankind: in process of centuries, the pure Celt recedes, while the Saxon or Teuton advances, and the mixed race formed intermediately remains stationary. The recession and gradual extinction of aboriginal American, Australian, and some South-African races before a mixed Saxo-Teutonic,—and as respects the Spaniard, a mixed Goto-Semitic race, offer analogous examples with variation of circumstances according to relative grades of civilization.—H. T.

logy of Chev. Bunsen shall, before I go much further, testify: but in the mean time I must go back to the vestiges which remain to us of one of those great races after their settlement as a civilized people, in order to trace the character of Egyptian influence over them.

I may here premise, that when writing on this subject in 1846, I alluded to the researches of Signor Botta (commenced in 1843) at Khorsabad, pointing out their immense importance, and stating that "we may look to receive from this quarter information of the most interesting and instructive character, as soon as the exploration of these ruins shall have been undertaken on an extensive scale. It may readily be conceived, that at such a time as this, vague speculation upon the character of the former tenants of these ancient realms, "would not only be valueless but even impertinent;" and Layard's Nineveh that now (1849) is before me, speaks confirmation, welcome and eloquent, of the justice of the opinion. This able man and delightful writer, who has driven by sheer sense, skill, and enterprise a new adit into the dark hill of history, has furnished us in one of his discoveries, with evidence of the adoption of Egyptian habits, and of the existence of an Egyptianised race in works of art (ivory carved figures with hieroglyphics and symbols of Egyptian sovereignty found at Nimroud) having in form and style of art a purely Egyptian character, though certain peculiarities would seem to mark the work of a foreign, perhaps an Assyrian artist;* the like were found at Kyomjik, another of the mighty mounds

* It is most interesting to compare in Mr. Dennis' Cities and Cemeteries of Etruria (2 Vols. 8vo. London, 1848), an archæological discovery of precisely similar character, simultaneously published with the Nineveh an one, as regards Egyptian imitative art, occurring in a very ancient Etruscan sepulchre at Vulci. This tomb, called by the discoverers *Grotto d' Iside* (Cit. and Cem. Vol. 1st. p. 419) is the burial place of two ladies of rank, "whose effigies are still in existence, though nearly three thousand years may have elapsed since their decease." Of the articles, vases, unguent-pots, and *alabastra*, in the tomb, "all have a strong Egyptian or oriental character; but with the exception of those evidently imported from the banks of the Nile, they are Etruscan imitations of Egyptian art, with the native stamp more or less strongly marked." Of a particular vase, Mr. Dennis further observes—"So Egyptian-like are the chariots, and the procession of females, painted on this vase that the general observer would take it for an importation: yet the learned have pronounced it Egyptian only in character, and native in execution, though of most archaic style, and early date." A necropolis of the

of ruins. But at Nimroud, a still stranger revelation was at hand. At a certain level in the mound, many tombs were found (Nineveh, vol. II. ch. XI.) containing the remains of the dead with vases, plates, mirrors, spoons, beads, and ornaments, "identical with similar remains found in the tombs of Egypt." Some of these tombs were built of baked bricks carefully joined, but without mortar; others were formed by large earthen sarcophagi covered with an entire alabaster slab. "Having carefully collected the contents of the tombs," says Mr. Layard, "I removed them, and dug deeper into the mound. I was surprised to find, about *five feet beneath them*, the remains of a building. Walls of unbaked bricks could still be traced; but the slabs with which they had been cased, were no longer in their places, being scattered about without order, and lying mostly with their faces on the flooring of baked bricks. Upon them were both sculptures and inscriptions." Here were the tombs *over* the ruins. The edifice had perished and in the earth and rubbish accumulating above its remains, a people, whose funeral vases, and ornaments were identical in form and material, with those found in the catacombs of Egypt, had buried their dead. "What race then occupied the country after the destruction of the Assyrian palaces? at what period were these tombs made?" asks Mr. Layard. He goes on to show us such differences in the character of the Assyrian bas-reliefs in the lower grave-buried palace, and that occupying the N. W. of the Nimroud mound, that one might think we read here a history of Assyrian power subverted, and of a strange (Egyptianised) race living and dying in and over their kingly halls, who were again subsequently so dispossessed, and eradicated by the re-establishment of Assyrian domination, as only to tell they had been ever there, by the mute and mournful eloquence of their graves! The course of ascertained Egyptian history, supports the silent evidence of these newly-discovered remains; their extreme antiquity and obscurity as respects all other historical authority, prepares for the reception of the established chronological computations of Chevalier Bunsen, which carry back the record of the succession of time, as synchronised with the

west, giving like intimation of a local Egyptian influence, with that shown in the palatial graves of Nimrod on the plain of the Tigris, adds great force to the truth of my exposition of the external impression, left lasting by the old Egyptians beyond their own land.—H. T.

circumstance of history, from a particular era, to an epoch infinitely more ancient, than any which previous research had as yet accorded to enquirers. For instance, to put the case on Bunsen's chronology; if the grave-buried palace above noted, had been destroyed or removed by Sesortosis II. (the great Sesostris of the 12th Egyptian dynasty, v. Bunsen *in loc.*), he, whom tradition asserts, I may add, the Assyrians to have deified,* a king whose exact entity research has identified, and whose exploits, history (v. Diodorus, &c. &c.) has ever celebrated, though confusedly with two others of the name who preceded and followed him:†—if he, I say, may be supposed to be the conqueror who settled an Egyptianised race in the seats of the Old Assyrians, this was about 2801 years before Christ, (v. Bunsen): about two hundred and fifty years after (B. C. 2560) commenced the era of a foreign domination in Egypt, that of the Hyksos, who seem to have been a

* ——— καὶ Σέσωστρις ἐκεῖνος τῷ κοσμοκράτωρ λέγεσθαι θεὸς τοῖς ἀσσυρίοις. Fourth Chiliad of the histories of Johannes Pzetzes (556-7): I do not remember seeing this belief, mentioned out of the rich mine of tradition, which the above Byzantine has left us;—nor have seen this passage before quoted from him.—H. T.

† I append at length another ancient allusion to the historical mystery of Sesostris, now cleared up in our own day from a fragment of Paulinus' metrical version of the lost book *De Regibus* by Suetonius (Oudendorp's Ed. Bak. 1751, 2 vol. 8vo.), preserved by Ausonius Epist. XIX.

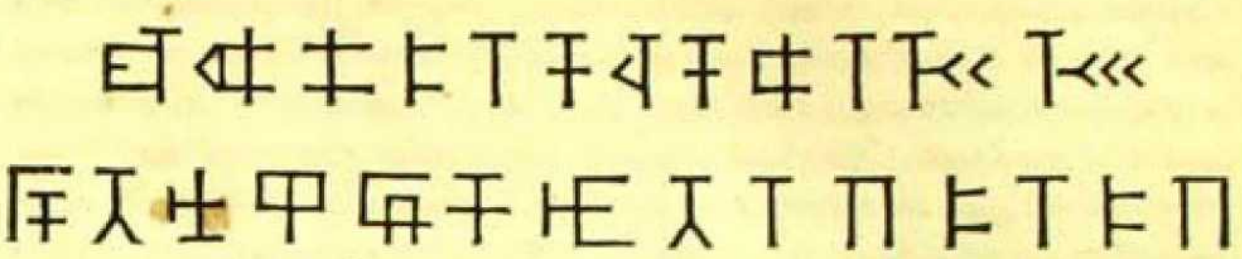
Europamque Asiamque duo vel maxima terræ
Membra, quibus Libyam dubie Sallustius addit,
Europæ adjunctam; possit quum tertia dici.
Regnatus multis, quos fama obliterata; et quos
Barbara Romanæ non tradunt nomina linguæ.
Illibanum, Numidamque Avelim, Parthumque Vononem,
Et Caranum, Pellæa dedit qui nomina regum,
Quique magos docuit mysteria vana Nechepsi,
Et qui regnavit sine nomine mox Sesostris.

It is curious to trace in this notice of the nameless Sesostris, (which word was doubtless taken, like Pharaoh, for a title) the confusion arising from the recurrence of a Sesortosis in several dynasties of Egyptian kings, and the result as expressed in obscure and remote tradition, at one time raising him to be a god, at another a mysterious monarch without a name! Incidents in study, like these, deserve record for the encouragement they hold out to research, which *will* in due time teach us.—H. T.

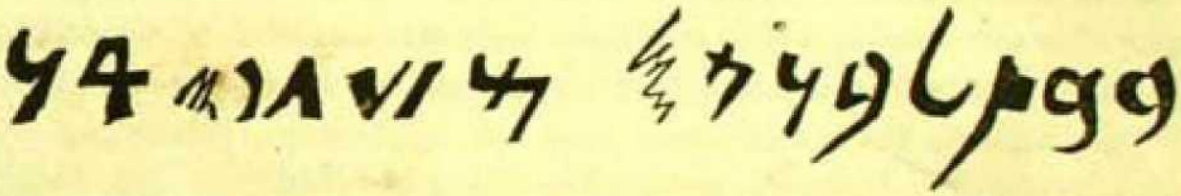
mixed race of Canaanites, and Bedouins (v. Bunsen); but, be they who they may, the description of the dominancy of Egypt by theory, will account for these graves in the Nimroud mound, first asserting the fact of her colonization there; and of the re-appearance of new Assyrian palaces, above these graves which surmounted the old ones, when the dispossessed race returned in victory to their ancient site of power.*

I have spoken as merely of conjectures in this paper; but as leading myself on to my own peculiar position, have, on the evidence of fact, moved the ancient Egyptian out of the "impress of his locality" into an ascertained residence towards the East, on the testimony of an archaiologist, and with the concurrence of an historiographer, who certainly wrote and thought as independently of each other, as distance and unconsciousness could make them do; meanwhile Mr. Layard affords strange matter for further conjecture in the inscription given below. "on a slab at Nimroud," he says, "forming a part of a wall in the south-west palace, but brought from the most ancient edifice, I found one line of writing in which the characters were thus formed. It occurred beneath the usual inscription, and was but slightly cut."

* Historic theories of the character above expressed, would a few years ago have been justly repudiated; but the progress of discovery begins to enable us to venture at an explanation of many mysteries; and no sooner does one astounding fact in the voiceless records of the past reach us from the East than in the West appears another, as strange and unexpected to corroborate the inference which the first directly points towards. I allude to the Egyptian character of the most ancient remains found in the tombs still extant, about the often nameless sites, of lost Etruscan cities, or rather, Etrurian, Umbrian, and Pelasgian; Dennis' Cities and Cemetries of Etruria. (Lond. 1848.) I may indeed go further still, as Mr. Dennis finds (Vol. II. pp. 39, 202), Etrusco-Ninevean traces, binding the East and West, as it were together. I cite for readier reference the passages in his excellent and intensely interesting work, which note the presence of an Egyptian element, in the early civilization of Italy. Etrusco-Egyptian, Vol. II. pp. 8, 296, 107, 114, 124. Pelasgo-Egyptian, pp. 48, 59, 62, 65, 72. Umbro-Egyptian or Siculo-Egyptian, p. 320, and for a combination of these archaic types, Vol. II. ch. 51, (Chinsi) and ch. 56, (Cortona) *passim*. On the latter site occur (p. 442), "many purely Egyptian idols," and a relic as indisputably pointing to an African origin, as the porcelain jars of the Egyptian tombs do to China,—the head in bronze "*of a negro.*" Here then, again, we have ancient Egypt, carried out of her supposed boundaries in the most practical of proofs.—H. T.



"It is evident," he observes, "that by substituting the wedge or arrowhead for the lines in the above inscription, the character would resemble such as are found on the earliest Assyrian monuments." This is doubtless; but left as they are, do they not exhibit a type of the earliest form of the Lat character of India?* Again, Mr. Layard gives us a single specimen of a cursive character found also at Nimroud, in fragments of pottery; also on an alabaster vase with cuneiform writing, containing the name of the Khorsabad king. "It has been found," he says, "on Babylonian bricks of the time of Nebuchadnezzar."



This character I had thought at once recognizable, as the cursive Ario-Bactrian, occurring on the slabs found in the Stuppa of Mankyala in the Punjab, fac-similes of which are with the Society, and which Professor Wilson (Arian Antiquities) has decyphered, and arranged alphabetically. But our able Secretary, Mr. Laidlay, has referred me to another alphabet, dialectic of the Hebrew, as set forth in the interpretation of the bilingual inscription of Thongga (Journal Asiatique, Fevrier, 1843) to which be conceives the characters of this brief specimen may be considered more properly to belong. Another copy of this inscription (Trans. of the American Ethnological Society, Vol. I.) by Mr. Catherwood who terms it Punico-Lybian, confirms this view,

* It will require but a cursory reference to James Prinsep's table of the Lat characters (As. Soc. Journal, Vol. VII.) to establish the affinity of the above letters with the oldest Lat form in use about 500 years B. C. perhaps in a transition state from the cuneiform to the lineal character?

These inscriptions afford at any rate monumental evidence of the contact of an Egyptianised race, resident far beyond the confines of the mother-country with foreign nations, whose habitat lay, in one case certainly, eastward. We had already proof that the produce of the extremest Orient found its way to Egypt; that of China, namely, in the shape of articles of porcelain, of such inferior quality as to argue that the manufacture was in its infancy when they were made, this constituting another proof of their high antiquity: it had been conjectured that these small vessels found in the tombs at Thebes contained some precious ingredient, and that they had reached Egypt in course of commerce through India.* We have now to note what may have been the epoch of this early commerce by reference to a newly-established chronology; what may have been the direction of this intercourse geographically, and finally, what were the people who, as Sir Gardner Wilkinson says, "at a very remote period" occupied India in connection with the ancient inhabitants of the Nile valley.

It is necessary, however, that I should, before speculating further upon this connection, which may have been collision in the first instance, set distinctly before my reader, from the ancient literature and poetry of the Hindus, their character, first, as aggressors, and as warriors quite as bold and skilful as the Egyptians themselves; and then as occupants of a conquered country which they had incompletely mastered out of the hands of its ancient inhabitants :† I will, recapitulating what was said in the treatise above alluded to, assign dates, or an approximation to them to both these epochs, with such remarks on the comparative character of Egyptian and Indian conquest as may suggest themselves. By the side of this chronology, I will then place the new Egyptian time-reckoning of Chevalier Bunsen with some of his remarks

* Wilkinson, Manners and Customs, Vol. III. ch. IX.

† A certain school of even modern archaiologers has assumed with such certitude the pre-eminent antiquity of all things Indian, and has asserted this theory so dogmatically, that it is not inexpedient to notice here, what one of the latest of them, the learned Eusebe Salverte, and his editors, have ventured on in terming "l'Hindoustan, *le berceau de la civilization du monde.*" (Des Sciences Orientales, Eus. Salverte, 2nd Ed. Paris, 1843, p. 406.) The vague and unauthoritative character of this learned writer's deductions touching ancient India may perhaps be separately noticed in the Society's Journal hereafter, with reference to other points of history.—H. T.

and those of others on the nations with whom the conquerors of the Nile valley combated, or treated; and lastly, I will submit my hypothesis touching a possible recognition of the brahminical conquerors on their progress.

Nothing is more easy than to prove by reference to ancient Sanscrit authorities, that the skill in arms of the brahminical race was really such, as to render them no contemptible opponents to troops as highly disciplined as were those of Egypt. The institutes of Manu,* which in their present shape, must have been in existence, according to Sir William Jones' calculation, 880 years before our era, contain in their seventh chapter definite instructions, not only as to the policy of war, but as to its detail, prescribing the seasons for military operations (VII. Sloka 182), the division of the army employed (VII. Sloka 185), "elephants, cavalry, cars, infantry, officers, attendants;" and the formations in which the troops should advance into action, or adopt on the line of march (VII. Sloka 107). These were various, such as line, column, wedge, or double wedge, rhomboid with far extended wings, with other formations (V. Wilson's Dictionary, *vyuha*†) involving the establishment of reserves—of tried men, or distinguished by known marks, "who are excellent both in sustaining a charge and in charging, who are fearless and incapable of desertions" (VII. Sl. 190). Nor was moral influence on the soldier forgotten.

* Jones' works, Vol. III,

† Under this word, equivalent to array, several fanciful formations are mentioned, the ear-shape, and flag-shape, and the macaru, or shape of the sea-monster. It is curious to find this formation reproduced (Raffles' Java, Vol. I. p. 281) in an island colonised beyond a doubt from this country under the slightly altered form of mengkara; and it shows the nationality of the early conquerors of India, and their decidedly military character, that they should carry with them, and so firmly establish the use and practices of their system of war, among their descendants as to lead them to believe, not only that they invented these, but that the scene of the great actions recorded in the military epic of the Mahabharat, fragments of which exist (Raffles' Java, Vol. I. Sp. 411) among the Javanese, lay in Java, and Madura. Sir S. Raffles's description of the military character of the Javanese, and more particularly of their adherence to their ancient system of tactics up to a comparatively recent period (the Matarim war about A. D. 1600), is a sort of collateral testimony to the soldier-like qualities of the ancient race whence they (Sansc. Yavana, wanderers) are undoubtedly descended. See Pritchard's Physical History of Man, Vol. II. p. 221.—H. T.

The third chapter of these Institutes, ordains, writing of purification, (Sl. 98) "By a soldier discharging the duties of his class, and slain in the field with brandished weapons, the highest sacrifice is in that instant complete; and so is his purification: this law is fixed."

In the Hitapodesa (ch. III.)* a similar degree of military arrangement and precaution is inculcated, and it is curious that in this work we should find the centre of the position occupied by the foot soldiers, as if to them were entrusted the maintenance of the main array. "In both wings let the cavalry be stationed; by the horses, chariots; by the chariots, elephants; by the elephants, infantry." Infantry again it is remarked, are useful at all seasons, while horses and elephants are not so, and it is among the foot-soldiers the king is to be in action: "let the sovereign place the infantry before him and take his station." It is however said, that "the elephant is the chief of the forces," and "the horse the strength of armies." The author emphatically establishes, that—"a small army, if excellent, is a great one," an admitted military axiom, the truth of which has been singularly lost sight of by most modern eastern nations, with whom number has been ignorantly identified with strength. Both in this work and the institutes of Manu, rules are given in the chapters from which I have already quoted, for the selection of strong-holds, the latter recommending that the king should reside (VII. Sl. 70), "in a capital having by way of fortress, a desert of about twenty miles round it," or else in one of the five order of fortressess, viz. of earth, of water, of trees, of men, or of mountains, whereof the last is preferable.

There is a generosity of feeling manifested in the warlike practices of this early time, which bespeaks a singular elevation of sentiment: thus the brahman, we evidently learn, took no advantage in the field of that sacred character, which if violated "by a blow even with a blade of grass" (IV. Sl. 166) given intentionally, condemned the striker "to twenty-one transmigrations in the womb of impure animals." If even the blow be struck in ignorance of the law "so as to shed blood (VI. Sl. 167) from the body of a brahman, not engaged in battle," a very heavy, though indefinite, punishment is assigned for it. There is again a very manly and humane spirit in the following provisions:— (VII. Sl. 90). "Let no man, engaged in combat, smite his foe with

* Sir W. Jones' works, Vol. VI.

sharp weapons concealed in wood, nor with arrows mischievously barbed, nor with poisoned arrows, nor with darts blazing with fire." (Sl. 91.) "Nor let him in a car or on horseback, strike his enemy alighted on the ground; nor an effeminate man; nor one who sues for life with closed palms; nor one whose hair is loose and obstructs his sight; nor one who sits down fatigued; nor one who says, I am thy captive." (Sl. 92.) "Nor one who sleeps; nor one who has lost his coat of mail; nor one who is marked; nor one who is disarmed; nor one who is a spectator, but not a combatant; nor one who is fighting with another man." (Sl. 93.) "Calling to mind the duty of honourable men, let him never slay one who has broken his weapon; nor one who is afflicted with private sorrow; nor one who has been grievously wounded; nor one who is terrified; nor one who turns his back." It is impossible for any code of the most exalted chivalry to exceed in generosity, the noble temper of these prohibitions, and we must acknowledge that the people among whom such laws were current, must have attained a very high degree of civilization.

The great Sanskrit epic of the Mahábhárat abounds in expositions of the armament and tactical arrangement of the early Hindus.* It

* By the assistance of a Sanskrit scholar of eminence Bábu Neel Rutna Háldár, and of a very able and intelligent pundit Sarodá Prashád, long employed by the Asiatic Society of Bengal, I have been able to prepare the following translated instances of what is stated above, from the Sections of the poem termed Bhishma and Drona Parva.

"O! Great king, now the hero (Arjuna) formed on both wings a disposition called Sringataka (the shape of a triple peaked mountain), which was very strong and capable of breaking that of the enemy.

On either horn of the array were placed Bhima Sena and Sátyaki, the great charioteer, with many thousands of cars, horses, and infantry.

Within the double boat-shaped force stood the king of men, Arjuna, whose horses were white, and whose flag was distinguished by (the symbol of) the monkey; in the centre the Rájá. Yud'histhira, and the two sons of Mádri (Nakula and Sahadeva") Vol. II. (Calcutta Ed.) p. 465, Bhishma Parva.

"By Bharadwája (Drona) was formed a disposition in the shape of a car with wheels, which extended twelve coss in length, and five in breadth.

This array was formed by Drona himself with a number of different valiant Rájás, who were placed therein, in different positions, and with numerous cars, horses, elephants, and infantry.

In rear of this disposition, drawn in the shape of the lotus, was formed a central

contains, with many episodes on various subjects, an account of the struggle for domination between the lines of Pándu and Kuru, two branches of the Lunar race of Indian sovereigns. The epoch of the history of the Mahábhárat,* has been fixed chronologically at about fourteen centuries before our era; its scene is laid in the country about Thánesar in Sirhind, a tract which has been the great battle-field of India, from time immemorial to our own days. The combatants were six Gangetic monarchs, those of Hastinápura, Mathurá, Panchála, Benares, Magadha, and Bengal, as well as Krishna who reigned in Guzerát. The tide of Hindu domination had not extended itself beyond the boundaries of Aryávarta, or in other words, further south than the Nerbudda river, even so late as the days of Manu, who after

array which was entirely impenetrable. In the centre of the formation shaped like the unblown water-lily, was also formed another under cover of it.

O! chief of Kshetriyas, numerous elephants, foot-soldiers, Rathins, (a) and horses appeared like (the meshes of) hundreds of thousand nets.

Warriors equipped with these shining weapons, bows, swords, scimitars, maces, javelins, and spears were posted amidst these armies.

Scimitars clear as the serene firmament, as well as shields made of the bull hide, and studded with hundreds of moons—glittered bright.

O! Great king, I have seen many elephants who were without their riders (lying in the field) like mountains, exceeding faint under the shafts of Bhishma." Vol. II. p. 643. Drona Parva.

"At mid-day, oh! great king, a furious battle took place, between Bhishma and Somaka, occasioning loss of lives.

I saw hundreds and thousands of horses of different countries, adorned with golden ornaments, running with the fleetness of the wind.

I also witnessed the horsemen running with their wounded horses, and causing their followers to run in all directions on the field of battle, with scimitars in their hands.

The elephants grappling with other elephants quickly came up to the infantry and horse. Then king Duryodhana sent ten thousand of valiant horsemen to resist the Pándavas." Vol. II. Bhishma Parva.

* Mr. Prichard in his 4th volume of the Physical History of Man has so massed together all authorities and opinions on this most interesting question (See p. 101, et seq.) that in place of referring to detached writers, I would earnestly recommend a perusal of his clear and compendious view of the subject, to all who feel any desire to imbibe definite ideas on a point of history, long either utterly obscure, or in the highest degree uncertain.—H. T.

(a) Those that ride in cars.

defining this region (II. Sl. 22) as the tract proper to civilized men, proceeds with a remarkable expression, which I never remember to have seen quoted with any reference to its force, to declare what country is holy, (II. Sl. 23). "That land, on which the black antelope naturally grazes, is held fit for the performance of sacrifices; but the land of the Mlechhas, or those who speak barbarously, differs widely from it."*

Now as the grazing ground of this antelope is confined to wide and open plains, and the land of the Mlechhas is put forward in contradistinction to it, the natural inference is, that the Hindus were as yet masters of no more than the open country, proving them by this evidence to have been a race of emigrant conquerors, imperfectly established in the land. The region whence they came, and the period at which they first appeared on the confines of India, are the subjects of enquiry which next suggest themselves, and chronologers going on the base of the ascertained date of the great war, and with the aid of the Rájatarangini, or annals of Cashmere, the only Indian history of any chronological authority, assign in the one case, 2256 before Christ, as the date about which the first Hindu colonies appeared on the confines of India, and in the other 2666 B. C. as the year of the commencement of the history of Cashmere, in which the first brahminical settlement appears to have been formed: Col. Tod, and Professor Wilson are severally the authors of these views. So much is certain, that Manu himself points to a northern origin (II. Sl. 17. 18), and that the great war itself was, as Mr. Prichard observes, (Vol. IV. p. 105,) an invasive movement southwards, "the first invasion of the Dekkhan by the sovereigns of northern Hindustan," indicatory of its being no more than a sequel of similar aggressions whereby the new sovereigns of northern India, had established themselves in the possessions they then held. In the case of a people, so marked as the Hindus by rigid adherence to ancestral habits, one may read their doubtful history inferentially; we know what was their onward progress of conquest after the age of the Mahábhárat, and knowing them to be strangers in the land they then occupied, may come to an easy conclusion as to the similarly aggressive progress by which they got there.

* For a notice of the Indian aboriginal races, see Prichard's Physical Hist. Vol. IV.

"Oh! Egypt, Egypt! fables only will remain extant of you, altogether incredible to later generations,—and nought will have fixed being, but the words hewn in the stone." So spoke prophetically, as quoted by Chevalier Bunsen from one of the Hermetic Books, Hermes to Asclepius; and, after the above review of the national character of another co-temporary people from their own written record of their habits and opinions, it is to the hewn stone, and the pictured wall that we must go back for an understanding of what were the warlike peculiarities of its congeners of the Nile valley, for the purpose of setting them in juxta-position with those we have just considered. It is not however necessary to encumber this paper with references to the evidence on record as to the eminent military character of the Egyptians. Their enterprise as soldiers, their discipline, and their prowess are sufficiently illustrated from their movements in works now happily diffused as a portion of the literature of the day. Their tactical arrangement of troops, and their superiority in the use of the war-chariot, are the two salient points in which, as warriors, they assimilate, almost to identity of custom, to the brahminical conquerors of India; who again differ from the Egyptians in two military usages, not less marked by the use of the horse as mounted equestrians, and the kind treatment of their adversaries in war,—the practical habit in the one case pointing to them, as a nation frequenting open plains, and still imbued with nomad instincts, and the moral restraint in the other, suggesting the existence of a scale of mental civilization infinitely superior to that of any other nation of antiquity: one might imagine that the generous forbearance of their military laws in the case of a flying or a vanquished foe, or even of an adversary taken at disadvantage, shadowed the germ of the Buddhistic doctrine of gentleness and mercy. The Egyptians, despite "the striking and even surprising analogy in social regulations, divisions and subdivisions of hereditary castes, the distribution of offices, the privileges and restrictions of different orders in the community," (Prichard's Phys. Hist. of Man, Vol. II. p. 193,) subsisting between themselves and the Hindus, exhibit sanguinary proofs of their having obliterated the attribute of mercy from their military code. In the well known paintings of Madeenet Haboo, the great Remses (Wilkinson's Egypt and Thebes, p. 61, *et seq.*), appears triumphant over nations whose mutilated remains

attest "*in heaps*" the ghastly massacre which had ensued on victory; in other places, scribes appear reckoning the number of such trophies. I cannot, with Sir G. Wilkinson, (Manners and Customs, Vol. I. p. 392,) look upon this custom as consonant with a mode of warfare not barbarous, nor with this evidence of the value attaching to the token of actual slaughter, conceive that "the representations of persons slaughtered by the Egyptians who have overtaken them, are intended to allude to what happened in the heat of action, and not to any wanton cruelty on the part of the victors." Sir G. Wilkinson's argument as to Egyptian mercy, deduced from the single incident at Madeenet Haboo, where the crew of an enemy's vessel are saved from the sinking craft, might be turned, on his own admission that the soldiers received a reward after the amount of slain was ascertained (Vol. I. p. 393), clearly against him, the foe being saved from the water to die more profitably for their captors, ashore. In any case, the Egyptians who represent themselves as ruthlessly slaughtering a flying enemy, are infinitely barbarous as compared with, perhaps, a kindred race, who, as above quoted, forbade the slaying not only of "one who turned his back," but of "one who was terrified," or who even had his sight obstructed by his disordered locks.

Now there arises a somewhat curious consideration out of this fact, based in a measure on the new views of Chevalier Bunsen, and partly on the evidence of monumental remains,—that this blood-thirsty method of conducting warfare was unknown to the Egyptians, until after they had undergone the foreign domination of the Hyksos, or Shepherd kings. I am unable to trace the existence of carved or pictured evidences of Egyptian cruelty in war during the 1076 years (Bunsen's B. III. p. 122) of the duration of the old dynasties from Manes, 3643 years before Christ, to the end of the reign of Amuntimaos.* In the

* Chevalier Bunsen gives from a very handsome tomb belonging to Nevótp, as his name is read, a high officer under Sesortosis II. one of the 13th or last of the ancient dynasty of kings, a singular instance of the mode in which conquered nations were anciently treated in civilized Egypt. "Here and in the neighbouring tombs," says our author, "one sees represented nearly all the occupations of ordinary life, hunting, fishing, dancing, play, the game (the *morra* of the Italians) played with the fingers: men blow glass, exactly as the Egyptians of the latter kingdom (or latter dynasties), and as we do." (Vol. II. VI. 2, Sesostris the

P27950 H4,138.

succeeding year, 2567 before Christ, began the reigns of the Hyksos dynasties, which lasted 866 years. To them succeeded the restoration of an enchorial monarchy, in what is called the 18th Egyptian dynasty, rich during its period of 229 years, with the names and acts of conquering monarchs; and it is during this period, more especially in the victorious reigns of Totmes the 3rd, and the great Remses, that the external triumphs of the Egyptians are pictorially celebrated, by those savage records of victory, of which I have previously made mention. Now as we cannot trace vestiges of the like cruelties before the Hyksos' period; and as "the intimate relation and almost exact parallelism that has been traced between the Egyptians and the Hindus," (Prichard *ut supra*) allow us to infer that the former were guided, while unpolluted by foreign intercourse, by similar laws with those which regulated the conduct of their supposed congeners;—the question arises, whether it were imitation of the savage customs of their

Great). Let me remark upon the exact similarity at all times here noted as obtaining in Egyptian usages, before proceeding to the one ancient exception so at variance with the customs current (v. Wilkinson) in this respect among the kings dominant, after the 866 years of the Hyksos rule. "But," continues Chev. B. "there is a pictured record in the above-named tomb of peculiar importance, dating in the sixth year of our monarch's reign, wherein are brought before Nevótp in great ceremony as a present from his lord 37 strangers, (perhaps meaning $\frac{1}{37}$ of the strangers taken,) as remarkable as such, by their complexion, dress, and the growth of their hair, as by being mentioned in that character in the inscription. A leader appears at the head of his followers, equipped with club, bow, shield, and lance; one of them strikes a seven-stringed lyre with the *plectrum*. The inscription terms them "the great captured strangers." Champollion seems to have maintained that they were Greeks. * * * Others have thought them to be the patriarch Jacob and his troop: and certainly the strangers appear depicted, although described as conquered, not as prisoners, with bounden hands, but free, and armed. This points at the embassy of some subjected northern people, perhaps too, depicts a tributary present, as shown in the gazelles, and the weapons which they bring."—I am at a loss to comprehend from what country of the *North* the gazelle could have come; but in another place the Chevalier repeats—"The remarkable representation of those light complexioned 'great strangers' in Nevótp's tomb points to the subjection of a northern people,"—not necessarily *northern*; but certainly to their humane treatment as "captured" *(gefangenen)* by Sesortosis II.—H. T.

rulers for the time (the Hyksos), or retaliation of cruelties and oppressions sustained for many centuries (to the hardening, doubtless, of the hearts of the oppressed), that originated among the Egyptians a barbarism in war utterly at variance with their advanced Hindu-like state in what we can see of their other habits? I read a sort of answer in an important observation, recorded by Mr. Layard with his usual accuracy, as respects the corresponding graven records of like cruelties discovered by him at Khorsabad, Konyunjib, and Nimroud: he made it in his consideration of the use of writing among the ancient Assyrians, but it has served a double purpose. "In the most ancient sculptures of Nimroud, there are no representations of scribes. *In the more recent however*, at (the three places above-named) we have eunuchs writing down the number of heads and the amount of spoil, on rolls of leather, or some other flexible material," (Nineveh and its remains. Vol. II. p. 184,) and the representation of this is given by Mr. Layard, where two figures, one bearded, the other apparently a eunuch, record the heads, a heap of which has already accumulated at their feet, brought to them by victorious soldiers. The possible use of the papyrus by these scribes leads Mr. Layard on to a consideration of the intercourse between Assyria and Egypt, about the period recorded in the sculpture, and this he with the concurrence of Mr. Birch, the learned co-labourer with Chevalier Bunsen in his Egyptian enquiries, refers *at the earliest* to the 18th Egyptian dynasty, or even to an epoch long posterior to it, that of the 22nd dynasty, which commenced only 982 years before Christ.

The necessary deduction from all which is, as respects the characters, habits, and opinions of the ancient Egyptians, that there is nothing in the pictured records to shake our belief, that anterior to the Hyksos dynasties, they possessed a degree of moral civilization, not inferior to that described in the written records of the Hindus; and that altogether consonant with the character attaching to them historically, as the benefactors and instructors of mankind; nay, further, we are enabled, under this impression, to confirm ourselves in the idea that the graves of that early Egyptianized race, whose very memory, like that of the old Etrurian tombs in Italy, had passed from the minds of those who superimposed palaces upon them,—give evidence, in the unwarlike nature of the objects they contain, of the resting place of a

tribe of peaceful settlers,* a point of value in my argument: for it enables me to connect the mythic and traditional histories of Egyptian influence beyond the confines of the Nile valley, with something so positive as a monumental record of that influence; and to find in 'the Egyptian Bacchus conquering and colonizing India,' the type of its existence, as belonging to a state of society anterior to the subjugation of old Egypt by a foreign race, and the partial corruption of its ancient habits.

What those habits were, appear, (to cumulate evidence,) in the character of the earliest types of the divine power among them,—the eight, or, according to Bunsen, the twelve, ancient gods, forerunners and begetters of the twelve Mediæval gods, to whom succeeded the Isis and Osiris worship, or third pantheon of Egypt. The symbol of power in all the representations of gods, on the oldest monuments, is "a sceptre termed," says Chevalier Bunsen, "*Gam*, and assumed as the emblem of a mild authority." Ammon, "the hidden god;" Khem, "the creative power;" Kulph, "the soul;" Moot, "the mother;" Ptah, "the Lord of truth;" Neith, "whose name is called, *From myself I come;*" Phra, "the sun;" are the chief deities of an ancient Pantheon, the spirit of which is peace. In them lies, to us, a recovery of the genealogy of ideas among a primitive people, who thus expressed figuratively their conception of the attributes of the godhead, worshipped variously in different localities of the same country; but, when its separate states were united under one ruler, forming indistinct acceptations of the same fact, the ground work for another creed, more wildly and loosely imaginative, and adopting itself, by borrowing from foreign sources perhaps, to the altered and altering habits of the nation. Thus in the second Pantheon of Egypt, and only there, among, even then, only the supplemental or minor divinities, we find *Anata*, or Anaitis, the goddess of victory, the first evidence of whose worship

* There is in the Egyptian types found in Etruria, a like absence of anything aggressive or injurious. The most remarkable instance of the barbarism of mutilation in war, as noted by Mr. Dennis, occurs on a vase at Volteria, representing the scene before Thebes, where one of the besiegers grasps a severed head by the hair, about to hurl, it into the city, (Cit. and Cem. of Etr. II. p. 176) a practice common afterwards with the Romans: "the style of art shows them to be of on very early period."—H. T.

does not occur, according to the accurate researches of Mr. Birch (Æg. Stelle. 1, 6, II.) on any monument anterior to the time of Ammenophis I. or the beginning of the eighteenth dynasty: her effigy, says Wilkinson, "is rarely found, and never as extant in a temple." Thus we have the earliest deification of the purely aggressive principle, exhibited in Egypt, at a period posterior to the rule of the Hyksos. But there is yet another point of still greater moment, as additionally proving the identity of origin in the case of the Egyptian, and the Hindu races,—the knowledge of which takes us a step beyond what has been as yet established as to their ancient analogies in moral opinion and practice; this is the verification of the assertion of the ever-true Herodotus, as established by Bunsen (v. 1, 6, III.), that the worship of Isis and Osiris,—or Isis, Osiris, and Horus, (*Her-God* in Egyptian, thus latinised,) was the only religious form "that was honoured and accepted throughout all Egypt." For a critical examination of every available monument, document, or authority shows that, "to speak out in plain terms," as Bunsen says, "the first and second Egyptian Pantheons are nothing more than the development, first in undivided and subsequently in subdivided theistic forms of particular attributes of Isis and Osiris, or of both as either compared or combined." Isis and Osiris, singly or together; or Isis, Osiris, and Horus in one, comprehend directly in themselves that whole Egyptian theistic system, which stands instead of Ammon and of Kneph, the hidden god, and the soul. What are these words but Colebrooke on the Vedas once again? "According to the most ancient annotations of the Indian scriptures"—those, that is, which hold here the place in history of monuments and graven stones—"these numerous names of persons and things are all resolvable into different titles of three deities, and ultimately of one God. The inference that these intend but one deity, is supported by many passages in the Veda, and is very clearly and concisely stated in the beginning of the index to the Rig-veda, on the authority of the Nirukta and of the Veda itself." In this identification of a first common belief we touch the root of the matter, and the mystery of the Egyptian theistic darkness is dispelled;—so that there is no need to recapitulate identities, however exact, in posterior creeds and doctrines, as to the eight Gods, the mundane egg, and so forth. Nay, we have even a clue, and a direct one, to the mental process

which created these theistic subdivisions in old Egypt, by study of the Buddhist and Bráhminical controversies,* in which dogmas on the one hand, and philosophic speculations on the other, show how sects were formed and new opinions started on the primeval basis of a hidden cause;—a soul or conscious vitality;—and thence *Her* or *Shiva*, as the case may be,—a triune God.†

But let us go from the natural to the mythic idea. It was said, years ago, by a very competent enquirer that, "the usual character of human testimony is substantial truth under circumstantial variety;"‡ and when such testimony is offered by witnesses unconsciously repeating the tale already told by others in another shape, why reject the whole as fable?—or why, in the endeavour to analyse either part of it separately, lose the spirit of the general tradition in which alone consists the clue to its true meaning? "These old tales and histories work according to their epoch so through and through each other, that they become hard to separate," observes Goethe, "and the wider they are sundered the greater the rents made in them."§ What are the Orphic and Pythagoric theories of abstinence from animal food and the shedding of blood (Sobeck Aglaophamus, Lib. II. c. II. *de vitâ orphicâ*), but the Buddhist doctrine inculcated in the Asoka edict (As. Soc. Jour. Vol. IX. p. 616) extant on its granite block in our Museum? What are the tales as to the origin of Cereal culture, and the pruned vine, but like indications of the progress of a settled society superseding the wild habits of the nomad and the hunter?

The mystery of Bacchus and Ceres is expressed, mystically, with reference to their mythic story, and, physically, with reference to the things they typify, wheat and its culture on the one hand; and on the

* The new edition of the Pilgrimage of Fa Hian in which my able friend, Mr. Laidlay, honorary Secretary to the Asiatic Society of Bengal, has enriched with his own valuable notes and illustrations all that Abel Remusat, Klaproth, and Landresse had already given the world on this interesting text, has (ch. xvii. 21) a compendious notice on this head affording easy reference.—H. T.

† The idea in which the hidden cause is taken by the Buddhists, with the sequence of the soul, or life creative and eternal, opposed by its causative converse, death, whose dominion is for a time only, gives the dual of a Godhead, Ormuzd and Ahriman, of ancient Persia, with the Manichæan and other dualistic creeds.—H. T.

‡ Paley, Evid. Christ, ch. II. 289.

§ Tag and Jahr Hefte, II. p. 19.

other that of the grape together with its produce. As saith the Scholiast (Pind. Isthm. VII. 3), (which I translate from Sobeck's Aglaophamus,) (B. I. p. 150), Dionysus the associate of Demeter; according to the mystical saying, because Zagreus Dionysus, born of Persephone is associate to or connected with her; but in the physical sense because the use of wine follows close upon that of wheat as food, the which is referred to Demeter. Varro (Augustinus Civ. VII. c. 20 *apud* Sobeck) explains the Eleusinian mysteries of Ceres with reference solely to the growth of corn, saying that Proserpine typifies simply the germination of its seed, which failing, gave rise to the fable that the ruler of the Shades had borne away Ceres' fair daughter. This fanciful and elegant exposition of the productive powers of the earth is too common to need further comment; but the excess of generative force assigned to the myth of Bacchus, as master of the vine, is greatly in advance of that of Ceres, and, as a symbol, is much more generally diffused. Bacchus, or Zagreus Dionysus, destroyed by the Titans, his limbs dispersed, and he himself reproduced and revivified even as Osiris was destroyed in like manner by Typho, and again revived, gives the idea of vital action and reaction.* Bacchus is sometimes the *νοῦν ὑλικόν*, or typical incorporation of mind with matter (Macrobius in Somn. 1. 12. p. 67, *apud* Sobeck): he is *δημιουργὸς* (Proclus in Tim. III. 184, ibid), sung of the more ancient poets as, brahmin-like, "twice-born," and filled with a creative force, second alone to that of Jupiter† himself. Identified with Osiris, he is Egyptian, and goes forth a conqueror of lands, being the Bacchus of the Nile mentioned by Herodotus; at another while (Cicero de Naturâ Deorum III. 23), he is the son of Jove and Proserpine, or the re-active force produced by the creative and germinative elements, or the son of Caprius (according to

* The cultivation of the vine in Egypt has been doubted, as having been anciently practised: Sir G. Wilkinson (Manners and Customs, Vol. II. p 152, et seq.) has largely established the fact, and the eminent care bestowed on the plant, which was trained, as to this day in Hindostan, over alleys of poles and thwarts, which the vines ultimately covered so as to form a continuous arbour. The hieroglyph to express *vineyard* is the conventional representation of such an alley. The story of Bacchus and of Osiris might be taken as figuratively expressing the plucking, crushing, and fermenting of the grape, a primeval antitype of Burns' 'John Barleycorn.'—H. T.

† Cap. x. lib. II. Aglaoph. Sobekii, et ibid, imo passim.

other accounts one of the Cabiri himself) king dominant in Asia; the offspring of Jove and Luna, i. e. of the creative element and the seasons (?); or lastly of Nisus and Thione.

It will be seen that we have insensibly passed from the mystical and physical character of the wine-god to his true mythical nature as an accessory to history. He is the invader of India, a peaceful one however, surrounded by troops of merry followers who with dance and shouting, herald his coming, and gladden the way he takes: he, as the very type of that fertility which culture directs to the benefit of mankind, becomes predominant as a king in Asia, the fertile; or as one of the mysterious three (as some say, *seven*) Cabiri, or as the son of one of them, he stands forth in dim tradition as among the number of the first benefactors of mankind. But Sobeck, the great critical historian of the mystical creeds of the Greeks, has contented himself with a mere examination of the actual nature of the mysteries as practised by them. He is the antagonist of all symbol-mongers;—he disbelieves in types and their alleged origins;—he refuses to acknowledge that Bacchus is Osiris, or indeed anything, beyond the *expost-facto* application of a fable to local practices current for years at the different seasons of the year among the early cultivators of scarce known and half-settled countries. In spite of this, and with all deference to so great an authority, I must take facts, laid open before us since he wrote (A. D. 1829), as authorising the admission of the type of the Egyptian Bacchus, as indication of the progress of civilization in whatsoever quarter the Egyptian evidences of that progress be discovered, be it by Dennis in old Etruria, or by Layard on the banks of the Euphrates. My first citation is of course purely collateral in proof, as showing generally the excursive character of this civilization; my second takes us directly on our Bacchic way towards India, to be met, we know not as yet at what point, by a race coming from another quarter; but verging to the same focus as ourselves, destined to fill the untried land with a modified form of Egyptian institutions, derived, shall we say, from one common source with these? The plurality of Bacchic gods, or of Bacchic types exceeding the number, as I have incidentally noticed, which is cited by Cicero, points in the historic application of the myth, to the identity of Bacchus with that description of inventive spirit in man, which diverts him from the chase and

the pasture to the elicitation of the productive powers of the earth. Even the biblical assurance that "*Noah was a husbandman,*" is confirmed to us by the record of the fact of his having "*planted a vineyard;*" and with this license for adopting the vine-type as the index to a settled and civilized existence, I need do no more than cite a parallel, but more familiar, instance* in mythical lore, to prove how

* Concurrent testimony shows us Hercules as a good type of the mythic process; he is Egyptian, Theban, Peloponnesian, and Dorian, on which three last Thirlwall (Hist. Greece) is excellent:—he is Phœnician as his name, *yercol* 'the Sinewy,' in Syriac, intimates, (Bishop Cumberland's Sanchoniatho apud Eusebium,) translated ἀρκλῆς: his twelve labours have received an astronomical application to the passage of the sun through the zodiacal signs: in history he is during the heroic period ubiquitous, always in connection with these labours, but not with reference to any astronomical application of them: he is (Sophocles' Trachiniæ) πολύπονος *the many laboured:* in the Philoctetes of the same author he is made to boast painfully of his deeds, while Euripides calling him *the mighty* (ὁ κλεινός) speaks of him (see the speech of Lycus in the Hercules Furens) as renowned only for brute force (τἄλλα δ' οὐδὲν ἄλκιμος) but famous no otherwise: the reply of Amphitryon, the 1st and 2nd choruses of this play, and the boasts of Hercules himself in it, exhibit the same stamp of character: all is material, as opposed to mental merit: thus Aristophanes in the last Act of his play of 'cuckoo-cloud land' (Aves) makes Hercules, sent on deputation from Olympus with Neptune, and a certain Triballus (a barbarian god who cannot speak Greek)—a bully, a blockhead, a traitor, and a glutton: F. Schlegel (I. p. 318 Geschichte A. and N. Lit.) notes Hercules' strength as a comic attribute, the attribute of mere force without mind, ludicrous from its unmeasured disproportioned excess:—this is a little epitome of the popular Grecian view of this hero, whom I take, in connection with his labours, to be simply *a mythic exposition of force used for good ends:* all his labours are beneficial, but he is a fool only able to boast of his endurance; but being always called in to aid the weak, or put down public evils (as we hear ever so-and-so was successful *with the help of Hercules)* I read in him and his twelve labours merely the lesson of good effects in the application of animal power to benefit instead of oppress mankind,—to which latter purpose it was from evil instinct, first applied. This reading of the meaning of the myth of Hercules was singularly confirmed by the manner in which Chev. Bunsen notes him as appearing (Æg. Stelle. I. 16, *Khunsu* χῶν) in his primeval form as attendant on other gods. "Out of all this" says he at the close of his summary, "one sees expressed *the character of the intermeddling accompanying god,* who figures now after Horus, at another time after Thoth." Will this idea, carried out as respects the twelve gods of the second Egyptian Pantheon, in which he first is seen, give us a fresh clue to the meaning of the twelve labours?—H. T.

the very plurality of beings in the case of any one alleged originator, points in all such cases, to the general exertion of a particular power, under the reiterated expression of a single name, or its acknowledged typical synonym.

The beneficent character of the early Egyptians in their intercourse with foreign nations, and their similarity in this respect of moral civilization with their congeners, the Hindus, being once established, as extant in times which Bunsen's chronology, and Layard's practical research now admit within the limit of the historical period, I take up the interesting question of their external relations at a much later epoch, when, having cast off the domination of the shepherd kings, they marched victoriously into other lands in that revengeful and savage spirit, of which they have left us such ample evidence. I cannot attempt this enquiry without quoting Chevalier Bunsen's excellent remarks upon such investigations, which at this time he deprecates, in order to show on what grounds an exception to his rule may, in this case, be admitted. He says (v. II. VI. VII. Sec. 2), "And here we must allow ourselves a word on the treatment up to this period of the names of foreign nations on Egyptian monuments. We stand in respect to a knowledge of these nations and countries on the threshold of great discoveries; but it will be very wise not to overstep this threshold prematurely. Since it seems overhasty, to declare summarily, as does Champollion, nations designated as northern to be Asiatic, and seek their names, if they show no affinity with known countries as Kanana and Naharáim (Canaan and Mesopotamia), as well in new catalogues of peoples as in Iran and Turan,—and not to find them." It is certainly, as above described, an overhasty process of nomination; the which sound reflection has not however hindered its author from concluding in p. 324 of his II. volume that the "great strangers" of Nevótp's tomb, whom he at p. 310, had termed a northern (European) people, "might still well be, even considering their light complexion, an Asiatic one." I do not myself desire to proffer conjectures in this spirit; but, while following the recorded exploits of the Egyptian conquerors of the 18th dynasty, should I find them connected with a people, whose habitat I can establish, whose conventional name I can recognize in their own language, whose position as a semi-nomad race I can chronologically define, and whose necessary intercourse and fami-

liarity with regions approximating to Egypt, I can deduce philologically from graven records and on the surest grounds,—I do not think I shall have overstepped the threshhold rashly, apart the minor details of identification which may have encouraged me in the attempt.

On the material point of chronological coincidence, I cannot be clear until I have laid before the reader, the Chevalier Bunsen's summary of results, derived from his acute examination of all authorities, bearing on the Ancient History of Egypt, as follows :—

"Chronological review of the Egyptian successions from the oldest historical contemporary point of incident, to the first year of Menes.

The re-discovered era of Menophthah.

We have found by means of critical examination into the internal evidence of the kings' lists and the monumental records, the following reckonings :—

The eighteenth dynasty lasted in nine reigns, ...		229 years.
The nineteenth,	„ „ five „	112
The twentieth,	„ „ twelve „	185
The twenty-first,	„ „ seven „	130
That is, in 33 reigns, ...		656 years.
The common average of the duration of these reigns,		$19\frac{1}{2}$ years.
„ „	of those of the eighteenth, ...	$25\frac{4}{9}$
„ „	of the nineteenth, ...	$22\frac{2}{5}$
„ „	of the twentieth, ...	$15\frac{5}{12}$
„ „	of the twenty-first, ...	$18\frac{3}{7}$

Our tables of cotemporary chronology (given at length in the fourth Book) show that reckoning upwards. The fifth year of Rehoboam corresponds with the 21st year of Sheshonk-Sesak, first king of the dynasty next ensuing, both periods corresponding with the 962nd year before the birth of Christ; for our investigation into synchronisms shows that the earliest possible period, we can assume is 963, the latest 961 : taking 962 as the mean, we find by reckoning upwards from this date the following dates for the main periods of the Egyptian successions through which we have as yet run.

First year of Sheshonk (XXII. 1), ...	B. C.	982
End of the 21st dynasty (lasted 130 years), ...		983
Beginning of ditto, ...		1112

End of the 20th dynasty (lasted 185 years), ... 1113
Beginning of ditto 1297
End of the 19th dynasty (lasted 112 years), ... 1298
BEGINNING OF THE REIGN OF MENOPHTHAH, ... 1322
Beginning of the 19th dynasty, ... 1409
End of the 18th dynasty (lasted 229 years), ... 1410
Beginning of the 18th dynasty, and of the new kingdom, ... 1638
End of the Hyksos dynasties (lasted 866 years),..... 1639
Beginning of them, ... 2567
End of the ancient kingdom (last year of Amuntimaos XIII. 3), which lasted 1076 years, ... 2568
Earlier reign of Amuntimaos (62 years), ... 2630
Beginning of the 13th dynasty (lasted 24 years—two first kings), 2654
„ of the 12th..... („ 147 years—four kings), .. 2801
„ of the 11th..... („ 16 years—one king), ... 2817
„ of the 8th ..... („ 128 years—seven kings), .. 2945
„ of the 7th ..... („ 22 years—one king),..... 2967
„ of the 6th ..... („ 107 years—three kings), .. 3074
„ of the 4th (Pyramids) („ 155 years—four kings, ... 3229
„ of the 3rd ..... („ 224 years—nine kings,) .. 3453
„ of the 1st ..... („ 190 years—five kings),.... 3643

According to this the era of Menes commences 3643 years before the birth of Christ." (Ægypten's Stelle, 3rd Book, II. E.)

A glance at this table, in which the era of Menophthah is prominently put forth by Bunsen on account of the discovery of the commencement of the last Egyptian cycle of 1460 years (the cycle of Sirius) during this reign, will show distinctly the periods during which the Egyptian connection with an eastern race is traced, as yet, with no purely historical outline: that the Indian Ráma is necessarily the Egyptian Bacchus, because *Ráma* (the high) is a pure Egyptian word, the root of the word *pyramid;* or that Brahmá, Vishnu, and Shiva or *Hara (Her*-god) are Amun, Kneph, and Her or Horus; or that, as the late Mr. Csoma de Korosi held in opinions* which he would never publish

* In a note to Dr. Campbell's Report of the last days of this most learned and estimable man (As. Soc. Journal, No. 124, 1842), I mentioned his mysterious method of conversing with me on such views as he seemed desirous of holding for his own satisfaction only: he never inclined to such conversation save when I

to the world, the name of ancient Bok-Hara (with other nomenclatures of other places) pointed to their occupation by a people that professed the Hindu religion, and spoke Sanskrit,—all this sort of thing is no proof, though it goes, *quantum valeat*, to the formation of private convictions. But it is of value as respects this period to have added, as I think I have done, to the known amount of moral analogies subsisting between the old Egyptians and the ancient Hindu settlers in India: and also to have commenced lending importance to the semi-history of its mythic traditions, *by a positive fact*, resulting from the visible evidence afforded by recent antiquarian discoveries. It is in nowise germane to our purpose to linger over the identification of the "great strangers" of Sesortosis the second; nor question whether our knowledge as natural historians would not assign to them, with their antelope, an eastern origin: it is, on these subjects, so easy to start hypotheses, that the very fact of the habitat of the black antelope being, according to Manu, the limit of Hindu civilization, might, with imaginative persons, serve as the basis of a fair theory as to the identity of the men, who brought with them this type of their exclusive right to be classed, as with the Egyptian castes, as not of the *Mlechchhas*, or unclean outcast men. The arbitrary assumptions of learned men and great authorities have been hardly less startling than the above, as regards the identity of the nations, whose names and conditions, as depicted on monuments of the 18th dynasty, or later empire of Egypt, I shall now, taking Sir G. Wilkinson for my guide, briefly recite.

1. *The Shairetana* inhabit a maritime country of Asia? wear a peculiar horned or crested helmet—features large, nose aquiline—far fairer than the Egyptians—appear as enemies and allies at different times.

2. *The Tokkari*—neighbours to the above, as they appear escaping in their ships?—wear a Persepolitan helmet, and a cuirass like the above—used war-chariots,—also carts with solid wheels for their women—facial outline pleasing—enemies and allies as above.

3. *(Name lost)*—wore a high fur cap like the ancient Persians—

visited our Museum, where he lived, when it was closed (as on Sundays), and perfectly quiet: I heard from him enough to know that an immense amount of the strangest erudition died with him.—H. T.

features remarkable, strongly defined, nose high and prominent—Asiatics.

4. (*Ditto ditto*)—appear with the above as allies—their ornament and dress, a tunic, shield, bow, and club, only discernable.

5. *The Rebo*—very formidable enemies,—numerous—Asiatics—eyes blue, nose aquiline, beard small and red—dress rich with many ornaments—inhabit a country of northern Asia very distant from Egypt, and far more temperate in climate; weapon, the bow—Parthians?

6. *The Pount*—bring tribute of leopard, baboon, ape, ostrich eggs and feathers, ebony, ivory, &c.: they are Nubians (Bunsen).

7. *The Shari*—Assyrians? or Arabians? nose prominent, cheek-bones high, beard large—robes loose and handsome—well armed, and own fortified towns, which after defeat in the field they defend bravely—the name points to Assyria.

8. *The Toersha*—a maritime people—connection with Egypt undefined—appear as conquered.

9. *The Mashoash*—Asiatics as well as No. 8,—differ in dress, but not in feature from them.

10.—*The Kufa*—inhabit a part of Asia considerably to the north of Palestine—long-haired, dresses rich, boots of cloth or leather highly ornamented—a rich people—bring tribute in the precious metals, with knives, beads, a little ivory, leathern bottles, and bronze or porcelain cups—their hair in tresses, descends to the middle of the back with projecting curls on the top of the head.

11. *The Kheta or Sheta*—a remarkable people whose troops were highly disciplined—skilled in fortification even to the use of the double fosse—use chariots, and have some cavalry,—seemed to consist of two distinct tribes—Scythians according to Champollion.

12. *Other nations*—who do not fall within our enquiry, being negro tribes, or apparently Canaanitish nations, &c. &c.

I must however, from among the miscellaneous classification of the above, except for special notice one race, the Ethiopian, whose habitat to the south of Egypt is designated markedly by the character of the tribute they bring; the long-horned ox, still extant in Abyssinia, occurs represented in such fashion as to induce assurance that the breed was peculiar, even at this early age, to one portion of the land; while, to mark the locality of this nation still more plainly, they

appear bringing that peculiar animal, the giraffe, the earliest *modern* notice of which is, I believe, by Marco Polo;—certainly by no naturalist before the sixteenth century. The sole habitat of this creature is in the forests of Nubia and Ethiopia, and the central tracts of Africa, says Pennant, not south of the Orange river, and so his range is as high as Senegal; he does not occur towards the west. Now, on the scheme of suppositions above suggested, we may see in this visit of nations, the men of Sidon with their ships;—or the Persepolitans;—the Armenians or the Parthians;—or the Assyrians, or, in the warlike Kheta, the "royal Scythians" of Herodotus; or even, in the Kufa, the sycophancy of some artist, who, from description, has endeavoured to represent the inhabitants of a country still further east bringing their silver, bronze, and porcelain as tribute;—all these theories *might*, some of them *do*, pass muster; but no one has seen the necessity of theorising as to the identity of the tribute-bearers of the giraffe. They, although their country was, and is, well stocked with, to speak technically, other pachydermata of great size and beauty,—they are represented as leading with them this rare and beautiful creature, type-animal of their land, and thus they stamp themselves Ethiopians. Had the representatives of any of the other nations about which we are in doubt, been provided in like sort,—had we found for instance a camel among them (the figure of which has never been seen on any monument in Egypt)—we should have recognized those with it as Bedouins; but such is not the case; there is but one considerable people else, whom, as depicted on the monuments of the 18th dynasty, we are enabled to identify by an index of like certitude, and them Sir G. Wilkinson describes as follows:

"The Rot-n̄-no, supposed by M. Champollion to be Lydians, were a nation with whom the Egyptians waged a long war. Their white complexion, tight dresses, and long gloves decide them to have been natives of a much colder climate than Egypt or Syria; and the productions of their country, which they bring as a tribute to the victorious Pharaoh, pronounce them to have lived in the east. These consist of horses, and even chariots, with four spoked wheels, very similar to the Egyptian curricle, rare woods, ivory, *elephants*, and bears, a profusion of elegant gold and silver vases, with rings of the same metal, *porcelain*, and jars filled with choice gums and resins used

for making incense, of which a greater quantity was derived from their country, than from any other tributary to Egypt. Their features were regular without the prominent nose that characterises some eastern people, represented in the sculptures; and they were of a very light colour, with brown or red hair, and blue eyes. Their long dress usually furnished with tight sleeves, and fastened by strings round the neck, either closed or folded over in front, and was sometimes secured by a girdle. Beneath the outer robe, they wore a kelt; and an ample cloak probably woollen, like the modern *herâm* or blanket of Barbary, was thrown over the whole dress; the head being generally covered with a close cap, or a fuller one bound with a fillet."

Now the elephant is evidently with these people, the type-animal; they are the only nation which presents it, and, as Mr. Layard has observed with reference to the elephant on the Nimroud obelisk (Nineveh, Part II. ch. VI.), the small size of the ear shows it to have been the representation of an Indian, not an African elephant. Mr. Champollion may have termed these people Lydians, and Mr. Birch may incline, as Mr. Layard says, "to identify them with the Cappadocians or Leuco-Syrians, inhabiting the country to the north and south of the Taurus: who, he conjectures, are also represented at Khorsabad. Their physical characteristics in the Egyptian sculptures are a light complexion, brown, or red hair, and blue eyes; and they bring horses, chariots, rare woods, ivory, gloves, a bear, and gold and silver vases *with the head of Baal.*" This description is taken from Birch's Memoir on the statistical tablet of Kurnak, though Sir G. Wilkinson is afterwards quoted; and certainly if Mr. Birch suppresses all mention of their type-animal, the elephant, which I do not doubt puzzled him in such company, and gives them *a head of Baal* which the exact Wilkinson has failed to see, he may "incline to identify" them with any thing he pleases; but untill he can prove the habitat of the elephant to have ever been Lydia, or Cappadocia, or Leuco-Syria, or any where to the west of the Indus in Asia, of which, as Mr. Layard justly observes, there is no record, he must abandon his hypothesis. For these tributaries, or ambassadors, are markedly furnished as with all the other nations represented in their company, with the produce, live or dead, the manufactures, and the very shrubs sometimes, peculiar *to their native land;* and consequently as *they* are the only people who

bring an elephant, and that elephant is an Indian one, they are necessarily Indians,—by which I understand dwellers on the banks of the Indus,—at least as necessarily as the habitat, otherwise doubtful, of the nation acknowledged to be Ethiopian is decided by their bringing with them a giraffe.

As I have placed the elephant upon the Indus, or in spots immediately adjacent to it, and as that animal is not now, to the best of my knowledge, found wild nearer the Sutlej even, than in the Dera valley, at the lower extremity whereof the Ganges leaves the hills, I am bound to give reasons for assigning, even at so remote a period, that *locus habitationis* to a creature, no longer heard of there. As late then as 1519 A. D., the rhinoceros, the shyest and most skulking of the larger pachyderms, was an ordinary object of chase on the Indus, and in the Punjáb, on the authority of that most accurate and intelligent of autobiographers, the Emperor Baber (Baber's Memoirs by Leyden, pp. 253, 292, 316.). As the animals affect similar covers, if the elephant were not there at that time, which Baber does not mention, he must have been harassed out of the country by centuries of pursuit, which the rhinoceros, being almost valueless but for his hide to make shields of, had escaped. But Baber mentions the wild elephant at places, strange to modern ears, as Calpee,* and Currah Manickpore (p. 315),—about Chunar (p. 407); while he notes, in another place, the lion and rhinoceros near Benares. If the argument, 'they *were* not because they *are* not,' be untenable on the evidence of three centuries, how ten times less against the silent inferences of thirty?

These Rot-n̄-no then were a people from about the banks of the Indus, or beyond it, who came into communication with the Egyptians, about 16 centuries before our era; but on the received idea of *an Indian*, that is, of a black or brown man, inhabiting a torrid climate, these fair-complexioned, blue-eyed, red-bearded strangers appear in-

* Within the last twenty years I have known the elephant, wild, though not in herds, in the bed of the old Ganges, not far from Meerut in the Doab, and the extinction of the lion in Hurriana has happened within that time: this animal was shot on the banks of the Chumbul, not very many years ago. I may mention that the present habitat of the rhinoceros is no where further west than the jangals of Pillibheet in Rohilkhand,—so much, with the cultivation and desiccation of countries, does the locale of their wild tenants vary.—H. T.

compatible with their own supposed habitat. This depends exactly upon the assumption that they have been long fixed residents in and about the low country on the Indus and the Jhelum, in which case they would we know (Prichard's Researches, I. 228) have contracted a greater or a less affinity, with the melanocomous character of complexion, as the result of the climate of those sites; but this is not the case with them: whence it follows that they had only recently arrived in, or perhaps that they but casually visited as yet the low country, the peculiar produce of which they are represented as displaying.

Now, whatever changes have occurred in these regions, climate has at any rate remained the same; so that when we now find a Caucasian race, fair-complexioned, brown or red-haired, and often red-bearded, still now occupy the Alpine valleys of the Indian Caucasus, from below the Hindu Koosh to Cashmere, in the easternmost of which the Indus has his course and the Jhelum his origin, we must conclude that the predecessors in this habitat of the Afghan and Cashmere tribes had no other physical attributes than themselves; and the question that naturally suggests itself upon this, is, have they any ancestral connection?

Afghanistan has been, as Professor Lassen so truly says, (on the history traced from Bactrian coins,) so long the highway and the battle-ground of converging nations, that the flux and reflux of races, have obliterated the knowledge of eras, or epochs as connected with the people, the Pushtawuh, speaker of Pushtoo, or Pathan, whom the Persians termed Afghan. Prichard (Res. IV. ed. 1844) collates all the evidences respecting this people, whose tradition is that their origin was from Gur, or Guristan, and whom the earliest authorities recognize as extant in their present location. Their language belongs to the Medo-Persian branch of the Indo-European tongues (Ritter Erdkunde, 6. S. 205, 206), and their race is that of a nearly connected branch of the old Arian (Wilkin, Geschichte der Af.). The complexion of the Afghans, as Elphinstone was the first to observe, varies with their climate, the eastern Afghans being dark, the western fair as Europeans with black, brown, or red beards and blue eyes, a true Caucasian race as Blumenbach has termed them: in eastern Afghanistan fair and dark complexions again appear in startling contrast, just according as the habits

of men have led them, or their forefathers, to hold to the high and cold country, or frequent, for trade, or service, the low and hot lands, —"some dark as Indians," as says Elphinstone, and as, in their country, see we. The latest actual colony of Pathans in Hindostan is at Rampore in Rohilkhand; and, although a friend of my own, a native of the place, told me that he remembered as a child hearing Pushtoo, still spoken in the *zananahs* there, the process of becoming Indianised in appearance, as far as complexion goes, is with the male population going on rapidly. From all which we deduce that there is nothing to be surprised at in the physical fact, that an apparently northern race may be represented as *Indian*, i. e. dwelling near, on, or about the river Indus.

It is not evidently from an ethnological investigation, that we can hope to derive any knowledge as to antecedent races here; but the truth is we do not require it. Monumental evidence, as at Bood Bameean, where Burnes saw "the colours as vivid, and the paintings as distinct as in the Egyptian tombs," in the female figures encircling the mutilated giant-idol,—the eight miles of rock hewn habitations, (and if nomenclature be worth aught, the mountain Hindu Koosh towering above them)—the Buddhistic remains disinterred, the Buddhistic shrines still visited within our era by votaries, in Afghanistan,—point the route of the migration of the civilizers of India, the higher castes of Hindus, whom Blumenbach also classes with the north Africans, as Caucasian, and the traces of whose progress are to be found even in Makran,* where Hindu pilgrims still visit Hinglaj, one of the fifty-one spots where fell the severed limbs of Sati (Egn. *Seti*) or Durgá.

But if ethnology give no help in this quarter, it is far different with the tribes of Cashmere. In that secluded valley an independent kingdom existed up to the 13th century of our era; with the physical peculiarities of complexion, natural to the climate of a plateau, 7000 feet above the level of the sea, the people are not the less *Indian* as to the tracing of their Hindu origin, and, as has been already noted, the only *Indian* history of any authenticity, is that belonging to their land. But to deduce dates from it, or indeed to do any more than

* As. Soc. Journal, v. note by me, Vol. IX, p. 154. (No. 98.) I quote this merely on the question of extent of the migratory influence: the places pilgrimised to by Hindus, beyond the present spread of Hinduism are very many.—H. T.

merely approximate to the estimate of definite periods in the early history of Hindostan, in this stage of our knowledge appears impossible. The key to an acquaintance with this most interesting subject is beyond the limits of the land; from the first time I endeavoured to study in this matter, this conviction insensibly formed itself in my mind, and I think recent discoveries, to which I will allude more particularly, tend to prove its justness. If however, it were possible to identify the Bráhminical conquerors, moving at a period, just anterior to the events of the Great War, from "between the two divine rivers *Saraswati* and *Drishadwati*, the tract of land which sages have named *Brahmavarta*, because it was frequented by gods,"*—in these Rot-ñ-no of the monuments,—these रथिन: perhaps of their own Sanscrit,—these *charioteers*, the title in which they took pride, even like "Sátyaki the great charioteer" of the Mahábhárat,—we should have valuable corroboration of the present received, but hardly proved, opinion, that this movement took place from the sixteenth to the fourteenth century before our era.† The irrefragable testimony of monuments added to ethnological evidences not less strong, conjoin with what there is of history, and that description of grave tradition which recorded in the legislation of a people, has been at all times admitted to rank as history, and all combine to show us the quarter whence these conquerors came, the way they took, the spots at which they halted on their way to this country, which they enriched with their language, their literature, and such a description of unprogressive civilization‡ as their institutions admitted. I think we have been now able to *time* an epoch in their progress by finding them again in collision with their congeners of Egypt, during the era in which these went forth over many lands, avenging the insult of a long subjection by making themselves terrible as conquerors, or, as apparently with the Rot-ñ-no, valued as allies or protectors.

* Manu, II. Sl. 17.

† The peculiar four-spoked chariot of these people, has been recognized by Mr. Layard as represented at Khorsabad, as among the spoil of a conquered city. (Nineveh. Part II. c. VI.) I have in this present notice purposely suppressed minor points of identification.—H. T.

‡ I use this term as equivalent to '*civilisation fixe*' which Salverte at the commencement of his great work (Des Sciences Occultes) distinguishes from '*civilisation perfectible*,' as respects the practical application of things known.—H. T.

My twofold object in the above enquiry will have been easily detected as respects the bráhminical conquerors.

1. To recognize them *as migratory in the act of migration.*

2. To fix a date for this act *from other than their own chronology.*

Success in this object, suppose it attained, will put a stop to that mystery and idea of excessive antiquity, as respects India which has so long palsied enquiry; for learned mystery is the worst of foes to true knowledge. The rich field of Sanskrit literature has taught us, itself, but nothing out of itself;—nor did the reading of inscribed copper plates and stones give us for many years more than a certain amount of local information. It was not until the time of him, for whom, the more I study the works of others the more I feel I have but one word,—the admirable James Prinsep, that the decypherage of the unread Pali gave on the one hand a philological result, and established on the other the connection of India at a certain time, with a certain people or peoples beyond her limits. This is, for any fact, a complete proof on the two evidences, internal and external: this is what I want to carry out at a period a few centuries anterior. We know that the high castes of the Hindus are not aborigines: we know that they did not find their science and philosophy, in India: we know therefore that they brought these, or their germ with them: we know that their impulse as a nation was purely progressive, and that they obeyed this impulse even to Ceylon, to Java and the Laccadives, both which last we call by the names they gave them: but we are certain that they never, as a nation, went back with their science and philosophy to teach it to other men; on the contrary, although individuals visited them and brought away their doctrines (or said they did), the nation that held these, deserted, site after site, if it was not too much to say so, their ancient haunts, mention of which however, still lives in their mythological history, and whither still their devotees make long and painful pilgrimages. Now the process whereby we shall ever know any thing of this people,—what their acts and deeds in India,—must be by seizing some definite epoch, like Bunsen's Menophthah-era, and working upwards to their origin from it.

My conception, as to the Egyptians I have already given, as much the older and more energetic people, perfecting their system of life and polity in a particular site, and going back on their own traces to disse-

minate the fruits of their amended knowledge to other men. The acceptation of Bunsen's chronology, gives countenance to this opinion, and Layard's researches go to confirm it; but in addition to these a discovery still more curious and interesting as respects the immediate subject of our enquiry, helps to combine the real history of these ancient races, viz. that the language of the cuneiform inscriptions is Sanskrit!* This is due to the decypherage of the Behistun and other inscriptions, published by the Royal Asiatic Society in their Journal, Vol. X. Parts I. to III. These inscriptions had long attracted the attention of Major Rawlinson, C. B. (now Pol. Agent at Baghdad), who some years ago, while employed at Candahar, did me the honour to propose their publication in this Journal, which was then my property. It is I think fortunate that the publication of these most valuable and interesting relics should have been delayed until after such authorities as Lassen, Westergaard, and Dittel had examined and written on them, and an editor so capable as Mr. Norris of the Royal Asiatic Society, was found to superintend the bringing of them out. These three forms or dialectic differences, the Persian, Median, and Babylonian, of the language represented in the cuneiform writing, and by one of these, doubtless the inscriptions found by Mr. Layard will long ago have been interpreted. That is to say, that on the site on

* The able and enterprising copyist and translator of these inscriptions is a little given to the mystery of learning in this matter: he terms the language of the inscriptions "*the language*," without a name; and this is the more to be regretted, because to look upon it as something apart from Sanskrit, or any definite tongue, though grammatically obeying the construction thereof, invites to the fatal facility of arbitrary interpretation: for instance (Journal, X. III. p. 314 to 318), the window inscription, repeated eighteen times, in the upper side of the windows of Darius' palace at Persepolis is, after *four pages and a half of discussion* rendered—"Erected by Ardasta, the architect for the palace (or in the palace) of King Darius." Here is the inscription in Roman characters.

Arda-stána a-thagaina Dar(a)zaon(h)ush naga hya vithiya karta.
High-place un-covered (for) Darius king who (the) house made.

Major Rawlinson's reading which obtains a proper name (the apparent object) is made by putting *naga-hya* as one word, and leaving the last half out of the translation altogether: at page 345, he tells us "*thaga*" with the prefixed particle *a* may denote "building," *athagaina* being "a Mason," &c. &c.: this is an odd use to press the Sanskrit and Greek privative particle into! the words are *ustashanám áthaganám*: this sort of criticism is unfortunate.—H. T.

which he found commixed the graves and hieroglyphs of an Egyptian race, lying over the ruins of an Assyrian palace, the language of the cuneiform or arrow-headed character, occurring on slabs with a primitive form of the Indian *Lat* writing, and (apparently) the letters of some Phœnician dialect,—will have declared itself to be the classic tongue of the ancient conquerors of India. Are we about to see fulfilled the prediction of Vans Kennedy as to the Babylonian origin of Sanskrit, and the Hindu mythology,—or, in other words, are we not approaching the solution of the affinity between the Hindu and the Egyptian?

"Time sadly overcometh all things and is now dominant, and sitteth upon a Sphinx, and looketh into Memphis and old Thebes; while his sister oblivion reclineth semi-somnous on a pyramid, gloriously triumphing, making puzzles of Titanian erections, and turning old glories into dreams. History sinketh beneath her cloud. The traveller as he paceth amazedly through those deserts, asketh of her, who builded them; and she mumbleth something but what it is he heareth not."*

So wrote two centuries ago, the great enquirer into vulgar errors; but those who sneer or doubt in these days as to the earthly limits of human enquiry, read their rebuke in the present refutations of a conclusion made then by even such a master-mind as his.

Descriptive notice of the District of Jhilum. *By* L. Bowring, *Esq.*

The district of Jhilum as at present constituted, extends from the Jhilum river on the E. to the Attock on the W. On the north it is bounded by the various tálukás of Ráwalpindí as the Pubbí country, Potwar, Syudkusran and Nurálí, the river Suán and Pindí Gheb; on the south, its limit is the Jhilum river as far as Dbák, whence it stretches due west, being bounded to the south by the districts of Khúsháb, Mittá, Tuwanah and Kuchi. In this extent of 130 miles, with a range of hills traversing the centre, it is natural that the character of the country should vary much; the ravine country to the north, the hills of the centre, and the fine fertile plains to the south, are well

* Fragment 'on Mummies,' by Sir Thomas Browne. Works, IV. p. 273, ed. 1836.

marked distinctions. But to give a better idea of the country, it is proposed to enter into a short account of each subdivision.

We shall begin with Rothas, which from its importance as the centre of a large tract of country, and as the key to the passage to the south, has been for many a century a place of note. The district of Rothas was subdivided formerly into 14 tracts. 1 Simli now Pudri and Jhangar, 2 Dhuralá, 3 Bárbukálá now included in Dhurálá, 4 Haveli now in Rajiv, 5 Rajiv, 6 Iskanderala, 7 Toliala, 8 Soliala now Pukhowal, 9 Terozala now Jhilum, 10 Akberpur Solimá now in Kala, 11 Shakirpur now in Kala, 12 Eesiala now Sungoi, 13 Shalijchuni now Khurd Chautálá, and 14 Pulliala on the opposite side of the Jhilum. This arrangement did not include what are called the Mundis, viz. Lehri, Sultánpur, Bhet and Dumeli, which have been for ages ruled by chiefs of the Gukkur caste. Under the Sikhs the denominations of the various divisions were altered, and each seems to have taken its name from the village, in which stood the principal fort. The town of Rothas is about 9 miles from Jhilum, the river Kuhan being crossed 3 or 4 times on the road. The town is inside the fort a vast structure, half a mile in length, and one quarter in breadth. It was built by Sher Shah Lodi, who for a brief period expelled Humayoon and ruled the Moghul empire. Several works of utility bearing his name are found in the Punjab, as for instance, the wells with covered steps in the road from Khushábs to the Indus. The fort was built 320 years ago, and has stood out time bravely. It covers the face of the high rock, near which passes the road from Bukrála. The gates are the Sohal, the Khwáskháni, Lungarkháni, Moti, Gutiáli, Parpulwáli, Tuláki, Cábuli, and inside, the Shah Chandwálá. Of these the Sohal is a handsome structure, 60 ft. high, built of sandstone with a fine spacious apartment above. The Lungarkháni and Khwáskháni gates, which are the most accessible have witnessed many a desperate combat. The district of Rothas was at the time of its conquests by the Sikhs in the possession of the Gukkurs, from the chief of whom, Noor Khán, it was wrested by Ranjit Singh, and bestowed by the old lion on Mohar Singh Lambá, one of his oldest comrades in Jageer. He was succeeded by Gurmúkh Singh now a white bearded old man, and the most ancient Sirdar probably in the Panjáb. Subsequently it was leased to Golab Singh, Misr Jussá Mull,

father of Rájá Lál Singh, Shekh Emám-oo-deen and Rájá Lál Singh, and was latterly managed by Misr Roop Lál. The former assessment of the Rothas district was 40,000, which was subsequently raised to 60,000. The present division is into 4 tuppehs, viz. Rájá Iskandarelá, Dhuralá and Toliálá, and 4 mundis, viz. Lehri, Sultánpur, Bhet and Dumeli. The mundis have till recently been assessed as a whole, the jummah of each village not being defined, and the revenue for the mundi being collected by the Gukkur headmen.

On the brow of the hill towards the Kuhan river adjacent to Rothas is a fine Khangah, said to be that of a Pír named Sháh Jamál; and built by Shah Jehan, who also erected the Serái on the other side of the stream. From Rothas the common route to Bukrálá winds along the course of the Kuhan to Udrana in tuppeh Dhurálá and thence to Bukrálá.

The last chief of Rothas, Rájá Fazl Dud Khán joined Sher Singh during the rebellion, he obtained from the latter assessment of the district of Rothas in Jageer as the reward of his service. From Rothas a road leads straight to Bukrálá by Chaukoa where is a fine tank built by Golab Singh. Bukrálá is a small village, or rather mundi, containing several small villages of which Bukrálá is the chief. The country round is a mass of hills, and the road very difficult. It was here that Dost Mohummad advised Sher Singh to hold out, and try his fortune in a second encounter. The headmen here, as at Rothas, are Gukkurs, and look upon themselves as of good family. Six kos east of Bukrálá is tuppeh Lehri, a strange little hilly district, the inhabitants of which bear a bad character for turbulence and ill faith. Their behaviour during the late campaign was conspicuously bad. From Bukrálá there is no camel road to Lehri, which is consequently very inaccessible. From the hills near the principal village the white fort of Mungalá, on the opposite side of the river Jhilum, seems quite close, and the district is one of the first which Golab Singh took possession of, the Zemindars still showing the rock which he ascended to survey his new conquest. Immediately east of Lehri is Sultánpur, a small mundi, only a few villages on the right bank of the Jhilum, and south of which lies tuppeh Tolialá. Proceeding west of Bukralá, one arrives at Dumeli six kos, a fine town of 500 houses, with a good bazar, situated on the river Kuhan. It is one of the most flourishing

towns in the Rothas district. The headmen here also are Gukkurs, and relations of Rájá Fazl Dud. The fourth mundi Bhet lies immediately under Mt. Tillah and is comparatively insignificant.

Jhilum the present head-quarter of the district, where two regiments of infantry are now stationed, was not considered of much importance during the time of the Sikhs. The present cantonment is about a mile W. of the town, bordering on the village of Saierla to the W.; to its south, runs the river Jhilum at a little distance. A little N. W. of the town is a mound of some extent, supposed to have been the site of one of Alexander's cities. Some coins of Menander, one of the later kings have been discovered there, and it is said that some years ago Golab Singh dug out a great number which he forwarded to Ranjit Singh. Jhilum when planted and in the possession of good roads will in all probability be a favourite station. The rapids of the river, about 4 miles to the east close to the village of Pakhowal, are very picturesque. About 3 miles from Jhilum is Kula a town of 500 houses.

On the road from Jhilum to Jelálpur, 7½ miles from the former place, is the town of Sungöi, the former residence of Rájá Lál Singh's family. The district was held in Jageer by Mjdh Singh Bhudániá, who first conquered it in the time of Ranjit Singh. A fine pukka fort built by him stands near the town. Sungöi is on the whole, the richest district in the Jhilum tehsil, the land being situated on the bank of the river. Ten miles west of Sungöi is the celebrated hill of Tillah. This very remarkable mountain is of some antiquity, being known in old writing by the name of Bál Gundái. At present it is the residence of the followers of Goraknáth, but the mountain is commonly known as the Jogis' hill. The ascent is long and wearisome, but the view from the summit very fine. At the top of the hill are 2 or 3 tanks, one of which contains superior water, but another built by Chand Koañr, the mother of Naunehál Singh proved a failure. The fakeers have large herds of cattle and possess also one or two villages in Jágeer: once a year a large festival is held at the top of the hill. The sect bury their dead. The view from Tillah commands the Garjak, Kúsak, Kuringili, and other hills. In the ravines of this mountain is found a species of the wild sheep called by the natives 'Ooriál;' and a species of osprey builds its nest in the higher peaks. Although Tillah is the head-quarters of the Goraknáth sect, there are several

other places, as the Sindh-ságar Doab, which are resorted to by them, the principal being Ráwalpindi, Pindi Gheb, Kotsárung, and Mukkad on the Indus. Adjoining the Tillah Range is the small district of Nárá, called by Lál Singh, Rámpur, in the principal village of which he built a fort called by him Rámpur, in a badly conceived situation commanded by an opposite hill. Though unfinished it cost 15,000, and is now falling to ruin. The headmen are by caste Januyán. The range of hills which runs from Rothas to Tillah, and thence by Nárá terminates at the Búnnáh river, on the opposite side of which stretches the salt range proper, which commences at Dárápur and extends to the Indus.

Two kos west of Sungöi is the small district of Chautálá, formerly a Jageer of Dul Singh Káliwálá. Between this and Dárápur one crosses the Boonnáh stream, which in the cold season is perfectly dry, the sandy bed extending a mile and half in width. In the rains after a heavy fall, the stream descends with such rapidity as to carry away either man or beast in the current.

The district of Dárápur contains no village of note. Opposite Dárápur in the left bank of the Jhilum is Kasúl, south of which lies the jungle in which was fought the battle of Chelianwálá. After the battle a great number of Sikhs fled across the river, and were drowned in the stream.

Between Dárápur and Jelálpur the hills approach so closely to the river, that there is barely room for a horseman to pass, indeed in the rainy season this lower road is shut.

Jelálpur is a place of some importance, being much frequented by salt and grain merchants, who take these articles across the river to the cantonments of Lahore and Vazírábád.

The town of Jelálpur was found by Jelál Khán and is of modern date. The old town was called Gurjakiá, from a lofty hill at the back of the town of the same name, named the Gurjak or the windy hill. The district of Jelálpur was wrested by Mahá Singh, Ranjit's father from Dewán Khodá Baksh. After its conquest it was given in Jageer to Ratan Singh Gurjakiá, lately deceased, who held it for 25 years. He was succeeded by Sirdar Gurmukh Singh Lambá, and more recently it was held by Rájá Golab Singh and after him by Lál Singh. The above districts are comprised in the Jhilum Tehsil, of which the following is an analysis.

District.	*No. of villages.*	*Revenue.*
Rothas.	171	50,000
Jhilum.	16	9,500
Kálá..	55	20,000
Sungöí.	22	20,000
Chautálá.	5	10,000
Nara...	11	5,000
Pakhowal.....	28	10,000
Dárápur.	26	12,000
Jelálpur.	23	12,000
Pudrí.	9	4,500
	366	1,53,000

In addition to the above are 19 villages in Jageer valued at 6000 yearly.

The routes in this tehsil are—I. from Jhilum to Rothas 9 miles, from Rothas to Udráná 9 miles, and from Udráná to Bukrálá 9 miles, or by the direct road from Rothas to Bukrálá 10 miles. II. From Jhilum to Chautálá 10½, from Chautálá to Dárápur 10½, and from Dárápur to Jelálpur 9 miles. A camel road also leads from Rothas directly westward, viz. Pudri to the Ghorigullá pass, through which the Sikhs used to bring their guns from Jelálpur to the level plain of Dhani on the further side.

The tehsil of Pind Dádan-khán comprises the following districts: 1 Jalub, 2 Jhangar, 3 Pind Dádan-khán, 4 Ahmedábád, 5 Kuhan. Jalub is a fine fertile tract extending from Jelálpur to Pind Dádan-khán, containing some large villages. The chief town Dehrialá contains 500 houses, and is midway between Jelálpur and Pind Dádan-khán. The district was wrested by Ranjit Singh from the father of the present headman Rájá Ahmed Khán who enjoys a small Jageer. There were 4 subdivisions, Jalub, Phuphrá, Pinjan and Punjain, of which at present only the first two exist, Jalub containing the villages towards the river, and Phuphrá those towards the salt range.

The hilly district of Jhangar contains 35 small villages, dispersed among the hills, and extends from Jelálpur to Kutas, being bounded on the S. by Phuphrá and Pind Dádankhán. It contains some remarkable hills, Chambul, Kusak, Mukhyálá, Kuringili and Drengun.

Four miles N of Dehriálá in Jalub is the village of Baghánwálá, midway between which and the Búnnah stream, on the sides of a ravine, coal is found of good quality; but the position being very inaccessible it is not probable that it could ever be worked, although the coal is superior to that found at Khyúrá and other parts of the range. About a mile from the village are the remains of a fort of some antiquity which in the time of Ranjit Singh belonged to Mallik Kádir Baksh, who was expelled, and a Sikh Thanna stationed there. In the fort is an old mosque in ruins, and adjoining a small tomb of red stone, bearing an Arabic inscription and said to be that of a certain Hans Gházi. Close by is an old Hindu temple, resembling that at Kutas, the architecture of which is very primitive. It is built of limestones which contain numerous petrifactions of leaves. The caste of the headmen of Baghánwálá is Januyán, which is apparently the prevailing caste among these hills. West of Baghánwálá in the centre of the hills, is the stronghold of Mukhyálá, in former days a fort of considerable strength which was razed by the Sikhs. The place being very inapproachable, the hillmen defied for a time the power of the Khalsa. The hills of Mukhyálá, Kusak and Kuringili were held by three relations, Sultan Sarfráz, Sultán Mehdi, and Sultan ?, who, descending from their mountain fastnesses, were in the habit of plundering travellers and the peaceable inhabitants of the plain. The present headman Sultan Nizábat Ali joined Sher Singh, and committed various excesses during the insurrection. South of Mukhyálá is the fort of Kusak, situated on the summit of a high peak standing forth out of the mass of hills. Three sides are inaccessible and the fourth which is sufficiently steep, is protected by a strong wall girding the hill. At the extreme top is a small white temple which is visible from a long distance. For many a month this fort held out against Ranjit Singh, the garrison being supplied with water from a tank in the place, while they laughed at the impotent efforts of the Sikhs. But the water failing, their chief was compelled to surrender. Strange to say, on the evening of the day upon which he came in, torrents of rain fell, and again filled the tank, but being a man of honour, he kept to his word and gave up the fort.

To the N. W. of Kusak is Kuringili a hill of very great height and remarkable appearance. It is chiefly noted for the antimony

which is found at the summit in small cubical bits, on the southern peak. The Zemindars who search for it, let themselves down by a rope over the face of the precipice and pick the mineral out of a hole beneath in the side of the rock, in which perilous adventure some unfortunates have lost their lives by falling down the cliff, a height of 5 or 600 feet. On the northern peak are the remains of an old fort, which was destroyed by the Sikhs, near this is a hole 2 feet in diameter, descending perpendicularly into the hill, concerning which a curious legend exists. It is related as follows.—In Cashmere lived a Saint named Makhdúm Jhanián, who one day disappeared from the hill on which he resided, and some time afterwards made his appearance on the top of Kuringili, having traversed the intermediate country under ground, and made his way upwards through the heart of the hill. On the Pír's arriving at the summit of the hill, which was then inhabited by Káfirs, he proceeded on to the village now known by the name of Makhdúm Jhanián, and containing the tomb of the saint. Here the people opposed him, upon which he prayed devoutly, and the whole village, being subverted by a miracle, was buried in ruins. On throwing stones down this hole they appear to fall a distance of 40 ft. and more. Some years ago an adventurous Zemindar descended with a lamp, but in a short time returned in a fright, declaring that he had seen the traces of the Pír's feet, upon which he lost courage and got himself drawn up again. Adjoining Kuringili is a high hill called Drengun or Chel, which is the highest peak in the salt range save Mt. Sikesar being considerably more lofty even than Kuringili. It is well wooded, and in the thickets which abound in it, hawks are caught in some numbers. Next to Drengun is a long hill called Diljabbá which terminates at the Ghorigullá pass.

Four miles S. S. W. of Kuringili is the hill fort of Dilur, a place of some strength commanding the route from Pind Dádan-khán to Chakhowal. The ascent is rather precipitous, but the want of good water makes it of less importance than it would otherwise be. It was built by a certain Bairu Khán.

The descent from this to the little village of Choyá Saidán Sháh is very rough and troublesome. On the road is a large stone called Saidán Sháh's stone, at the most difficult point, where the path narrows considerably, and for a horse, is almost dangerous. To this travellers

pay reverence salaming to it and saying 'show me the way, oh! mother.' Choyá Saidán Sháh is a very picturesque little place embosomed in hills, with a clear stream of fresh water flowing through it, which abounds in fish of the mahsir species. This rivulet escapes from the pool at Kutas, which is about 2 miles from Choyá and passing by the salt mines of Mukrach, loses itself in the level plain to the south. Choyá is said to be the coolest place in the country in the hot season, which is owing to its protected position and the number of fine trees which skirt the side of the mountain stream. From Choyá two roads lead to Pind Dádan-khán, one by Dundot, the other by the salt mines of Khyurá, the former being that frequented by camels, the other route being very rough and difficult. Dundot is a small village in the summit of the range, commanding a fine view of the country round.

The district of Pind Dádan-khán or more properly Khokar comprises only 4 villages. Of these the chief is Pind Dádan-khán, a large town containing 4000 houses, situated about a mile and a half, from the Jhilum and 4 miles from the salt range. The inhabitants are chiefly Hindus and engaged in the salt trade, the only manufactures being 'bechobáh' tents, woollen namdáhs, and a few other articles. The town contains a large mud fort with one or two good rooms in it, but nothing else worthy of mention; and is a straggling place consisting of three separate towns, which have in the course of time been amalgamated, under the common name of Pind Dádan-khán or Dádan-khán's village. The salt mines have been worked for ages, but we have no authentic account of them before the time of Akbar, whose rates of hire for carrying and loading still prevail. The following are the principal mines commencing from the eastward; 1 Jutáná, 2 Khurá, 3 Khyurá, 4 Mukrách, 5 Sardi, 6 Sur, 7 Niláwán, 8 Choyá, 9 Varchá and 10 Kalabágh. The best salt is extracted from Khyurá, Sardi and Choyá, the largest of all the mines, being that of Khyurá where there are 8 shafts, viz. Buggi, Sujwálá, Mukhad, Matwálá, Phurwálá, Chenganwálá, Trudde and Fakirwálá; the principal of which are the two first. The Buggi shaft is of regular structure and contains first rate salt, but the Sujwálá is the most remarkable and the largest; it is however, rather dangerous, the roof sometimes falling in. The entrance is by an irregular descent, and the distance to the place where the miners are at work about 250 yards, but the shaft extends much further.

The vault where the mineral is dug out, is a mass of salt above and below and on all sides, the crystal being hewn out of the rock, in large masses by pickaxes, and carried out of the mine by manual labour. The roofs of the mines are covered with stalactites of fantastical shapes. In the time of Ranjit Singh, the mines were under the superintendence of Rájá Goláb Singh, who managed them for many years. He was succeeded by Misr Umir Chánd, a half brother of Rájá Lál Singh; In 1904, Dewán Mulráj obtained the lease of them, and in 1905, Misr Kallu Rám, one of the oldest and most respectable officials in the Punjab. The former rate of salt was 1½ Rs. per maund, the seer of the mines being 114 Rs. weight. The price was raised in 1905, to 2 Rs. per seer, and has since the annexation of the Punjab been raised to 2 Rs. a maund, the seer being of 80 Rs. Formerly the byápári obtained some further advantages, by certain reductions callad 'choot and gularvat,' the former being a percentage allowed on the quantity of salt bought, and the latter a reduction made on account of the loss sustained by melting. The miners receive 5 Rupees per 100 maunds for the salt conveyed by them to the mouth of the pit, and when the shaft is in position not accessible by cattle 2 Rs. per 100 maunds, for conveying the salt from the mouth of the pit to the village of Khyurá: a further sum of 4 Rs. per 100 maunds was charged to the byápári, for conveying the salt on bullocks to the mundi at Pind Dádan-khán; but the byápáris now carry it away themselves. It is said that in the time of Akbar, 12 lacs of maunds of salt were extracted from the salt range, and the rate being then 2½ Rs. a maund, the revenue derived was 30 lacs of Rupees.

The camels employed in the carriage of salt are reared chiefly on the 'Thul' country of Ahmedábád, and the sandy tracts of Mitta Tuwánáh, and Kuchi to the southward. Upon these camels a grazing tax called 'trini,' is levied of 2 Rs. a head yearly, the gross amount settled on each village, being paid by the chief men of the 'Koris' or herds. In some parts of the Punjab, the revenue derived from this source is very great, the 'trini' of Kot Kumáliá and Syudwálá in the Recháb Doab, being above 50,000 Rs. yearly, in the time of the Sikh regime, and the single town of Núrpur Tuwánáh paying more than 7000 Rs.* The mines now worked are Khyurá, Mukrách and Surdi, the

* N. B. The cattle used in the salt trade are called by the local name of 'láshia.'

others being shut for the present. The Khyurá salt which is produced in endless quantity, is carried chiefly to the southward; that of Surdi finds its way to Cashmere, while that of Mukrách is carried to the northward to the Hazára country.

The salt of Kalabágh is conveyed to Mooltan and the Deráját, while that of Kohat on the other side of the Indus, is used in Afghanistan. This latter however, is of very inferior quality, being black in colour externally and very course. It is extremely cheap however, averaging only about 2 annas a maund, but the Sikhs never permitted it to be taken into the Punjab.

Ahmedábád is a large district bordering on Pind Dádankhán on the east, and Khushab on the west, the greater number of the villages lying along the banks of the river, but some of the largest being situated in what is called the 'Thul,' or the flat country towards the hills, where extensive crops of bájrá are raised. This tract is however, almost solely dependent on rain. The town of Ahmedábád contains about 400 houses, and is much frequented by grain merchants, who convey the wheat and grain of the Dhuni country by this route, to Háfizábád on the other side of the Chinab; near the town are a series of high mounds of gravel, which are to all appearance an offshoot of the salt range. The place is called Burárià, and has the reputation of being the site of an old city. Excavations made near the surface, have discovered the foundations of several houses, the chunam used in building which is of great thickness, more resembling brick than chunam. A great quantity of copper coins, beads, pieces of iron, bits of gold, &c. have been recently found also; but nothing to indicate the origin of the place. By the natives it is asserted that it is the ancient Bhadráwati mentioned in the Mahábhárat, as the residence of the Rájá Jobnath, during whose reign the Pándavas made a sally on the city, and carried off his favourite horse to complete the 'aswamedha.' I believe, however, that the true situation of Bhadráwati was near the Chenab; but the story of the Pándavas, having sojourned on the salt range is universally believed in. A hill called Dhurimári near Baghánwálá, Kutas and Mt. Sikesar are all cited, as having been in turn the abiding places of the persecuted Pándavas. The original holder of Ahmedábád was the father of the present headman, Rájá Khodá Baksh.

The district of Kuhan is chiefly known as containing the celebrated Kutas. This pool though picturesque and of old fame, can scarcely stand a comparison with its rival at Ajmere, the other eye of the world. It issues from several clifts in the limestone rock, and is of a circular shape whence the name Kútáksha, about 30 yds. across either way, and is in some places of very great depth, so much so, that the holy men assert it to be unfathomable. The stream after issuing from the pool pursues a winding course to Choyá Saidán Sháh, through a highly picturesque valley. The pool is surrounded by temples and Thákur Dwáras, the principal being those of bairágis, who here, as elsewhere, are not on very good terms with the Sannyásis. The Thákur Dwáras owe their origin to the piety of the principal officials of Ranjit Singh, Goláb Singh, Misr Beli Rám, Dewan Múlráj and others, having each in this way erected a monument to commemorate their virtue. Goláb Singh in particular was very fond of building religious edifices at other people's expense. West of the pool is a temple believed to be of very great age, and ascribed to the time of the Pándavas. It is built of limestone containing numerous petrifactions, in the 'Khel' style of architecture, which consists of a narrow passage inside the outer wall, incircling a second inner wall, within which is a small compartment. This is continued through two stories, and the building is consequently very compact and solid, and may doubtless have existed for many centuries. The great festival here is held in the month of Baisákha, when numerous pilgrims assemble from all quarters. The 'jajmán' books of the principal officiating priests, contain the names of all the chief personages of the Punjab. The Jhind Rájá, Rájá Dinánáth, and all the Sikh Sirdars of the country, have in turn inscribed their names in these interesting volumes.

The village of Dulwál contains a very fine house built by Misr Beli Rám, who was murdered in the time of Hírá Singh. Dulwál is generally known as the Kánúngöi's village, this family having for centuries held that office in the district of Kuhan.

Annexed is an abstract of the above districts, which comprehend the Pind Dádan-khán Tehsil.

Districts.	*No. of villages.*	*Revenue.*
Jalub, ...	41	55,000
Jhangar, ...	33	15,000

Khokar, ...	4	12,000
Ahmedábád, ...	51	72,000
Kuhan, ...	12	24,000
	141	1,78,000

In addition to the above are 8 villages in Jageer, valued at 10,000. The Tehsil of Chakhowal, comprises the Tálukás of Dhuni, Syadpur, Doman, Hasdá and Gurhá.

The district of Dhuni Chakhowal comprises the following subdivisions, Bubrál, Haveli, Kuhastáni, Chowperá, Bádshákháni and Karpuwal; and contains 138 villages. Tradition says that the emperor Báber, who is reported to have resided for some time at Kallur Kuhár, observing the uncultivated condition of the plain of Dhuni, and the capabilities of the soil, sent for a certain Rájá Mull from Jammú, who took up his abode at Mullot in the salt range, and subjected Dhuni to the plough. Accordingly a host of men from the hills settled in the plain, the principal of whom were Vír, Múríd, Chukku, Kuran and Muthá, the five sons of Sidhur, and the district acquired the name of the Vír Patti; the táluká of Syadpur, being called the Lundi Patti or the rogue's strip, that district being a narrow strip of land skirting the Drengun and Diljabbá hills. The three principal castes of Dhuni are Mair, Kusur and Kahutá which claim for themselves a Rajpoot origin. Of these the Mair are chiefly settled in Haveli and Rupuwal, the Kusur in Chowperá and Bubrál, and the Kahutás in Kahutáni.

Dhuni formerly consisted of 84 villages, as did also Pindigheb. The holding of land is curious. Throughout the whole of Chakhowal the villages are divided into 'asámis' or land estimated at 360 Punjabi beegahs more or less, and assessed at from 100 to 300 Rs., 150 being the general average. Thus every village is said to contain 3, 4, 5, &c. asámis, and the rate of each being ascertained, the assessment of a village is simple enough.

Chakhowal is a large town, containing 1200 houses, but though healthily situated, is a desolate-looking place, being in the centre of a dead plain, and surrounded on all sides by ravines. The land is however very fertile. The Chawdhuris or headmen of Chakhowal,

formerly possessed great influence in the district, and held large Jágeers. During the rebellion they went over at Mooltan with Sher Singh, and then proceeded to Dhuni to plunder the country. On Mrs. George Lawrence passing through, they stopped her and compelled her to return, demanding a bribe of 1,000 Rs. as the price of allowing her to proceed. For this act of treachery they were imprisoned by Major Nicholson, but contrived to make their escape from his custody during an affray which took place between that officer's troops and the Khabris of Mïani. After the annexation all their Jageers were as a matter of course confiscated. The other large towns of Chakhowal are—Bhon a place famous for its bráhmans ; Kuriálá near which is the source of the Bunnah stream, which flows through the Ghorigallá pass, towards Dárápur ; Dudhiálá, a large village containing a number of Sikh residents chiefly old Ghorcharhás ; and Bádsbáháni. The Dhuni breed of horses is now nearly extinct. Syadpur is a recently confiscated Jageer, which belonged to Kanh Singh Majitiá, one of the officers in the Peshawar force. It had been in the possession of the Majitiá family since the time of Mahá Singh, and Uttam Singh uncle of Kanh Singh, did much to improve the town and cultivate the district, where his name is deservedly popular. The district is commonly called the Lundi Patti, it being said that a certain munshi managed to conceal the existence of this cultivated land, and collected the revenue on his own account, from which circumstance it acquired the name of the 'rogue's strip.' The town of Syadpur contains a well built mud fort, with two bastions and four dam-dammas. The town is immediately N of the Kuringili hill. Trees are very numerous in the vicinity, and are the property of Government.

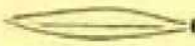
Doman is about 5 miles N of Syadpur, and is of little importance except as being on the high road to the Ghorigallá pass.

It contains a small fort built by Joy Singh Atáriwálá, and it was in this, that Major G. Lawrence, was for some time confined.

It is also remarkable as having been the birth-place of Sher Singh, This district was for many years in the hands of the Atáriwálá family, and latterly belonged to Chatar Singh.

The district of Hasolá, which is also a confiscated Jageer of Chatar Singh's borders on Syad Kusrán and Nuráli in the Ráwalpindi

zillah. The town of Hasolá is of tolerable size, but the district is barren, being much cut up by ravines. The fort at Hasolá was built by Jaya Singh, who fled to Cabul, during the time of Ranjit, having incurred the old lion's displeasure.

In several parts of the Chakhowal Tehsil, gold is found in the rainy season in the numerous streams which flow from the salt range to the north, the rate at which the 'drúns,' as they are called are assessed, being 5 Rs. a year. The drún is like a small punt boat  open at the smaller end. At the upper end twigs of trees and grass are placed, upon which is deposited the dark sand containing the gold particles. Over this streams of water are dashed continually, and while the lighter sand escapes at the small end of the drún, the heavier containing the gold remains at the bottom, whence it is afterwards removed and again sifted in a kind of concave platter called a 'patri.' The number of drúns on the Chakhowal Tehsil is 53, and the amount levied yearly 225, but the gold is not of such fine quality as that found further west. The occupation is not much in vogue now, in consequence of the light land assessments, but in years of scarcity the drúns are worked with great assiduity by the poorer class of people.

At Mukhad on the Indus, the drúns are very numerous, and the sum formerly levied from this source exceeded 500 a year. One man in two days collects enough gold to form a small pill, the Government taking at Mukhad a fee of 3 Rs. per tola, the gold afterwards selling at 15 Rs. or rather more.

The above districts form the Chakhowal Tehsil of which the following is an analysis.

Districts.	*No. of villages.*	*Revenue.*
Dhuni, ...	138	1,40,000
Syadpur, ...	44	20,000
Doman, ...	27	10,000
Hasolá, ...	18	16,000
Gurhá, ...	13	5,500
	240	1,91,500

Gurhá is a small district, a confiscated Jageer of Surat Singh Majitiá to the east of the Ghorigallá pass.

Besides the above villages, there are 12 in Jageer valued at 4000.

The Tehsil of Tullá-ganj comprises the following tálúkás. Kullar, Kuhár, Nurpur Suhuti, Tullá-ganj, Jabbi Résh, and Pakar Namal. The district of Kuhár lies to the west of Kuhan, the road leading through a fertile plain. It was formerly held in Jageer by the celebrated Sirdar Hari Singh Naluá, who built a fort on a hill, at some distance from Kuhár, in which several state prisoners have been confined. The chief village Kuhár is most beautifully situated, at the edge of a salt lake, three miles in circumference, which is covered with water-fowl. From a cleft in the hills to the rear issues a spring of warm water, which flows through the level sward, wooded by fine trees, in which strut about hundreds of peacocks. On the summit of a neighbouring eminence is the Khangah of the tutelary saint to which, it is said, a leopard resorts every Friday to make his salám. The whole appearance of the place is very picturesque, so much so as to have charmed the emperor Baber, who is said to have resided there for 6 months, and the Zemindars point out still a large boulder, in which steps are hewn, which they assert to be the seat from which he used to contemplate the attractive scene before him. From the high hills behind Kuhár is seen the level plain of Dhuni to the north, a road leading from Kuhár to Chakhowal viâ Bhon, and another to Tullá-ganj viâ Bharpur, while a third path through the hills to the S. W. conducts one to Nurpur. At a distance of some miles from Kuhár, is the hill fort of Mullote now in ruins, said to have been built by the Rájá Mall who first cultivated Dhuni. It is situated on the southern edge of the salt range, and midway between it and the village of Dundot, are the salt mines of Mukrách formerly mentioned. The mines of Surdi, which is a village in the district of Kuhár, are celebrated for the goodness of the salt extracted which is conveyed in large quantities to Cashmere. The salt vies with that of Khyurá in fineness, and is of a very beautiful transparent colour. The Surdi mines are approached by a large gorge, which seems to be a distinctive feature, the salt being almost invariably worked in the gorges of the hills, where it is apparently best and most easily extracted. The district of Nurpur Suhutti presents nothing worthy of note, save the salt mines of Nilwán, and those of Sur which are at present shut. In a valley formed by the rocks on either side, are the remains of what

was once a fort. Salt lies here on the surface, and used to be frequently abstracted by the zemindars, who are of the troublesome caste of Awán. This stubborn race is to be found chiefly in Nurpur, Tullá, Pukár and the Jageer districts of Sone and Khubakki, whence it runs westward till it is encountered by the Pathans on the Indus. Coal is found at a village called Bhúl, but is not of good quality. In the hills between Nurpur and Kuthá, the mountain sheep above alluded to is found, and is known by the natives as the 'úriál.' It is found generally in the salt range from Mt. Tillah to Mt. Sikesar; but is apparently seldom met with, being either very scarce or very shy. The body of the animal resembles that of a deer both in its contour and in the colour of the hair; the head however is like that of a sheep, and is adorned by splendid horns resembling those of a fighting ram, but much larger. The horns are 12 inches long, and have some 25 annulations. The ears of the animal are about 4 inches long, and from the chin on either side depends a bunch of coarse black hair, 4 inches long, like the beard of a goat. A streak of similar hair runs along the chest which is white. This animal is probably a new species.

Nurpur Suhutti was in former days a Jageer of Sirdar Jodh Singh Bhangu.

Tullá-ganj is a rich fertile district resembling the plain of Chakhowal, of which it is in fact a continuation, being about 24 miles west of that place. It was formerly a Jageer of Dhuná Singh Malwe, one of the oldest and most respectable Sikh Sirdars, but was confiscated by Rájá Lál Singh, during his Vizárat among his other remedies for patching up the state. The land being light, gram is grown in great quantities here, as in Chakhowal, and is carried south to the cantonments of Vazirábád and Lahore. In fact this plain of Dhuni is emphatically the gram country of the Punjab.

The town of Tullá contains 600 houses, and is flourishing. The Zemindars are Awáns and very turbulent.

In the streams of this district, gold is found in some quantity, especially in that of Gambhir, the gold of which is very good. The total number of drúns varies, but may be estimated at 50, the assessment on which is 100 yearly. From Tullá a road leads to Nurpur Suhutti viâ Chenji through the hills. An offshoot of the sect of Gorak-

padas reside at Kotsárang in the Tullá district, and profess to have been settled there for some time. The whole of the sect meet however at the Phálgun festival on the summit of Mt. Tillah.

The district of Jabbi Resh lies on either side of the river Súán the Suánus of antiquity, a part of the district of Pakar Namal intervening between it and Tullá-ganj.

Jabbi may be called the boundary of the Panjábi race, the country beyond being solely inhabited by Pathans, speaking Pushtoo, and calling their neighbours the people of Hind, in contradistinction to themselves. Jabbi was a Jageer of Sirdar Gundá Singh Mattu, from whom it lapsed to the government in 1904. The villages on the farther side of the river, border on the hills of Nurrá with the inhabitants of which the Jabbi men have been at constant feud. The Nurrá people are a soldier-like race, good marksmen, and possessing good horses, and have made themselves a thorn in the side of the Panjábis. Their little domain is wild and very inaccessible, but is capable of being well cultivated. Similar to Nurrá is the tract called Shaikel in the fork made by the junction of the Súán with the Attock, the inhabitants of which have a bad character; they were in the habit of plundering travellers on their road to Mukhad, and escaping to the hills. Shaikel contains three small tuppehs, viz. Kazzú, Gulbegi and Alikhán, each of which is subdivided into several small hamlets. Each plough pays 1-5 on the spring, and 8 annas on the autumn crop to Mallik Alliyár Khán of Kálabágh. The Wans Súán villages of the Jabbi district have recently been transferred to Ráwalpindi.

The gold found in the Súán river is of good quality, being of a rich yellow colour, whereas that of the Indus is of a pale dirty colour, and is called by the natives 'suféd.' The total number of drúns worked is 60, producing a revenue of 140 yearly. The zemindars of Jabbi are Awáns and turbulent, opposite to the village of Nikki on the other side of the Attock is the dark peak of Dinghot, where some old ruins exist, and the headmen of Kálabágh, Mukhad and other places profess to be of Dinghot descent.

The district of Pakar Namal is of great extent, bordering on Tullá-ganj on E.; the Attock on W.; the Jabbi district on N.; and the salt range on S. It contains some very large villages, such as Namal assessed at 8,500; but they are few in number, and present a singular

contrast to those of Chakhowal, which are numerous, and still more so to the country in the Jhilum tehsil, where a village encounters one every few hundred yards. Dhoks so called, or little hamlets, are however rising up and with the spread of cultivation will doubtless increase in number.

The range of hills which extends from Namal to Mári opposite Kálabágh is called Majúch. Kálabágh not belonging properly to this district, it is unnecessary to enter into any description of its various products, its salt, its alum, and its dying materials. Mári contains some remarkable temples of apparently the same era as that at Kutás. In the Majúch hill near the village of Jabu, and about 8 miles east of Mári sulphur is found in some quantity, and also petroleum called by the natives 'lalidá,' which is used by them in lieu of oil. Namal is situated in a recess of the hills, which in the neighbourhood are of great height, but of little width, a camel road leading across to Músakhel on the southern side, a distance of about 4 miles. Músakhel is in the district of Kuchi which together with Pakar Namal was in former days held in Jágeer by Rám Singh Deli. The hills about Namal are a flinty limestone, and on their summits contain numerous fossils. Flints are found in great abundance, and were formerly collected in great numbers for the use of the Sikh troops. About a kos from the village, coal is found at the bottom of the ravines of pretty good quality, but in difficult positions. The substance called Ról from which alum is made, and which has an astringent taste, is also found, as also salt, sulphur in small quantities, and Khái which is used in dying. The sulphur issues in a decomposed state from the rocks, and gives a chalybeate taste to the stream of clear water, which here flows through the hills, and which receives from it a yellow colour.

It is reported that copper has been found in small quantities on these hills. The account is either false, or if true the place has been concealed or forgotten. It is not however improbable, that in the vast mass of hills which stretches S. E. from Namal to a distance of 6 kos, and which is little frequented from its barren nature, copper may be found. This range known by the name of Sikesar is of very remarkable appearance, and will be alluded to presently. Adjoining the district of Namal to the east in its southern part is the Chachi Jageer consisting of 13 villages, the principal of which is Láwá. The

zemindars of Namal and Láwá are all Awáns, and the fathers of turbulence, having been accustomed from time immemorial to wage a constant war with their Jageerdárs, not unfrequently getting the upper hand. Some 15 years ago the men of Láwá refused to pay their revenue to Sirdar Uttam Singh Chachi, who proceeded with his horsemen to exact payment. The zemindars resisted him by force of arms, and a skirmish ensued, which lasted all day and terminated in the evening, by the Sirdar being struck in the forehead by a random shot and killed. His son warned by his predecessor's fate, built a strong little fort to protect himself and family from his unruly subjects. It is said that the village of Namal could formerly produce 500 matchlocks.

Since they have been disarmed, the character of the people has somewhat improved.

The above tálúkás are included in the Tullá-ganj Tehsil, and their respective revenue is as follows.

Districts.	*No. of Villages.*	*Revenue.*
Kullar Kuhár, ...	18	15,000
Nurpur Suhutti, ...	28	30,000
Tullá-ganj, ...	29	55,000
Jabbi, ...	10	10,000
Pakar Namal, ...	24	35,000
	109	1,45,000

In addition to the above villages, there are eleven in Jageer valued at 7000.

Besides those districts already mentioned, which complete the list of Government villages, there are two tálukás in Jageer, Sone and Kutha, the former a Jageer of Sirdar Gurmukh Singh Lambá, the latter of Sirdar Shamsher Singh Sindhánwálá. They are situated in that part of the Punjab which is least known, not being in any of the usual routes traversed. In fact there is no entrance and exit, except over very rough and difficult hills, to which perhaps is to be attributed the general ignorance as to their position. The Jageer of Shamsher Singh borders on Nurpur Shuhutti, to the east at a point, where the hills diminish in height, and a road leads across the salt range. It is divided into three portions, Thoyá north of the hills, Khubakki in

the centre of the range, and Kuthá Dhák, to the south; of which the two latter alone are worthy of mention. At about four miles from Kuthá is Nur-Singh-Phohár, or the fountain of Nur Singh. Tradition relates that the avatár proceeded hither from Mooltán after the slaughter of the demon, and washed his hands in the stream which issues from the rock. This story is implicitly believed in by the natives, and a festival is held there annually in the month of April. The water rushes out of a cleft of the rock, and falls over the precipice into a ravine beneath, whence it wends its way out of the hills to the level plain in which Kuthá is situated.

This romantic little place is embowered in hills, and the trees in which it abounds afford shelter and shade to a great number of peacocks; in the edge of the cliff is a small temple built by Rájá Goláb Singh, with an inscription on it in Gurmukhi to the following effect; "This temple, the possession of the Sirkar (an humble allusion to Ranjit Singh!) was dedicated on 15 Poh, 1887, to the service of Nur-Singh-Phohár, by Rájá Goláb Singh." West of Nur-Singh is the táluká of Khubakki containing a few small villages, situated in a narrow strip of land between the hills. On either side of the village of Khubakki, east and west, is a fresh water lake, found by the accumulation of the water from the hills in the rainy season. Both of them are alive with wild ducks and other waterfowl, but the zemindars being an indolent race, they are not applied to the purposes of irrigation. They are, each about half a mile wide, and rather more in length.

About 7 miles west of Khubakki, commences the district of Sone which contains the great salt lake incorrectly laid down in most maps. The principal town of this district is Nausheráh, a village containing 300 houses. The fertile plain which is here enclosed between the hills contains 14 or 15 villages, the whole of the available land being under cultivation, but the zemindars being of the Awán caste are extremely lazy, and pay little attention to the soil. Besides the route from Khubakki, there is another road leading into the Sone táluká from Láwá, by the village of Angá, but the hills which lie between are with difficulty traversed by camels, and the road is little known. The salt lake is situated about 6 miles W. of Nausheráh at the fort of Mt. Sikesar. It is about $1\frac{1}{2}$ miles long and $\frac{2}{3}$ mile wide, but in the rainy season is half as large again as this. The water is very brackish and contains no fish, but is covered with wild fowl. There is apparently no

salt stream to supply the lake; the only rivulet which runs into it worth mentioning being a small stream, which comes from about three miles distance and is fresh at its source; and the salt quality of the lake, therefore, must be supplied from beneath. The salt mines of Choyá and Várchá, are situated on the southern side of the range of hills, which border on the Sone district.

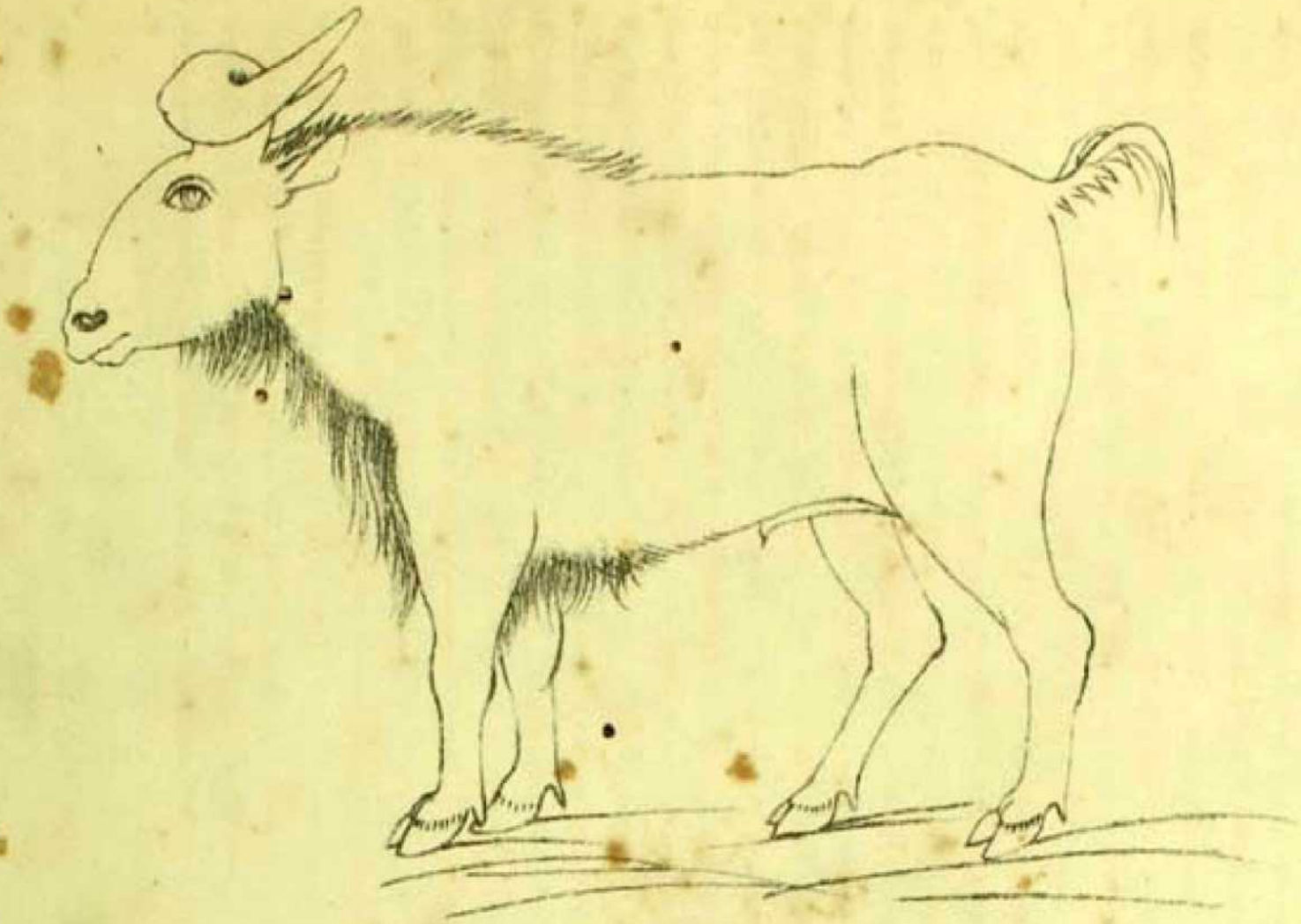
The salt lake extends in length from W. by S. to E. by N. On the N. side it touches the hills, which on the S. are 2½ kos off, and on the W. about 1 kos. On the brink of the lake are the villages of Chittá and Ugáli. To the west of the lake commences the ascent of the Sikesar hill, a peak rising up out of the other hills to a great height. The path to the summit is very rough, steep and difficult, but on account of the respect in which the hill is held, from the belief that the Pándavas resided there in their time of trouble, it is looked upon as a place of pilgrimage. The higher parts are not unfrequently covered with snow in the cold weather, and the level places near the top in which water collects during the rains, abound in shrubs and flowers not found beneath, and which would probably well repay botanical research.

An immense stone fabled to have been placed there by the Pándavas, is the point at which the April festival is held. The extreme summit is crowned by a small house now in ruins, built by a bairágí. This point is called the Singhásan or royal seat.

From Sikesar, the Attock and Jhilum rivers are easily discerned, and it is said that the Chenab is also visible in a clear day. The surrounding country lies stretched out like a map beneath. The directions of the chief places seen are as follows: Namal N. W. ½ N. Nausheráh, E. ½ N. Khwbakki, E. N. E. Chukrálá, N. N. W. ½ N. The salt lake or Samudra as it is called by the natives, E. by W. Wah-i-kailá south of the salt range, S., &c.

From Sikesar the hills of the Putial range extend in a series of ridges to a distance of 9 or 10 miles in an unbroken line, without a single village intervening. It is in this hitherto unknown region that copper is supposed to exist, and it is much to be desired, that these hills should be examined by a scientific observer, and their geological and botanical capabilities be made known.

Wherever the kos is mentioned in the above statement, it is assumed to be a mile and a half, which experience has shown to be about the average of the Panjábi kos on the further side of the Chenab.



BUDORCAS TAXICOLOR,

Tákin or Bovine Antelope of the Eastern Himalaya.

On the Tákin of the Eastern Himálaya : Budorcas Taxicolor mihi N. G. (With three Plates.)*—*By* B. H. Hodgson, *Esq.*

When characterising in the autumn of 1847, the genera of the Ruminants of India,† I remarked on the nearly total absence of the Bovine Antelopes, a group abundantly diffused throughout central and Southern Africa, but of which we had then in India no recorded sample, except the Nilgáü or Portax Risia, and of that single species no instance on this—the moist and temperate side of the Ganges. The remarkable animal which will be the subject of the present paper, adds however, another and a highly characteristic species to that group ; and, when it is stated that this animal has its abode in the Mishmi mountains, or, in other words, in the Eastern Himálaya, all persons conversant with the features and climate‡ of that locality will readily acknowledge the interest attaching to the discovery in our moist umbrageous and precipitous mountains, of a large and striking quadruped all the allies of which, with one exception, are proper to the arid and fervid plains of central and Southern Africa.§ My spoils consist of three skins in good condition belonging to males and females of mature age, of a nearly perfect male scull, and parts of other sculls of both sexes.

To Major Jenkins' kindness I am indebted for the whole, part of which reached me nearly two years ago, but too imperfect for description. The spoils I now possess are however quite adequate, and will justify the announcement of a new genus and species, which I proceed to characterise and describe without further preface.

The large, massive and remarkable animal, denominated Tákin by the Mishmis, and Kin by the Khámtis, is one of the group of Bovine Antelopes. Its nearest affinity is probably to the Gnoos ; but it has various points of stronger connexion with Musk Oxen, and in a natural

* Βοῦς et Δορκάς.

† J. A. S. No. 181, for July 1847, with corrections in No. 197, for Nov. 1848.

‡ J. A. S. No. 185, for December 1847, and No. 206, for August 1849.

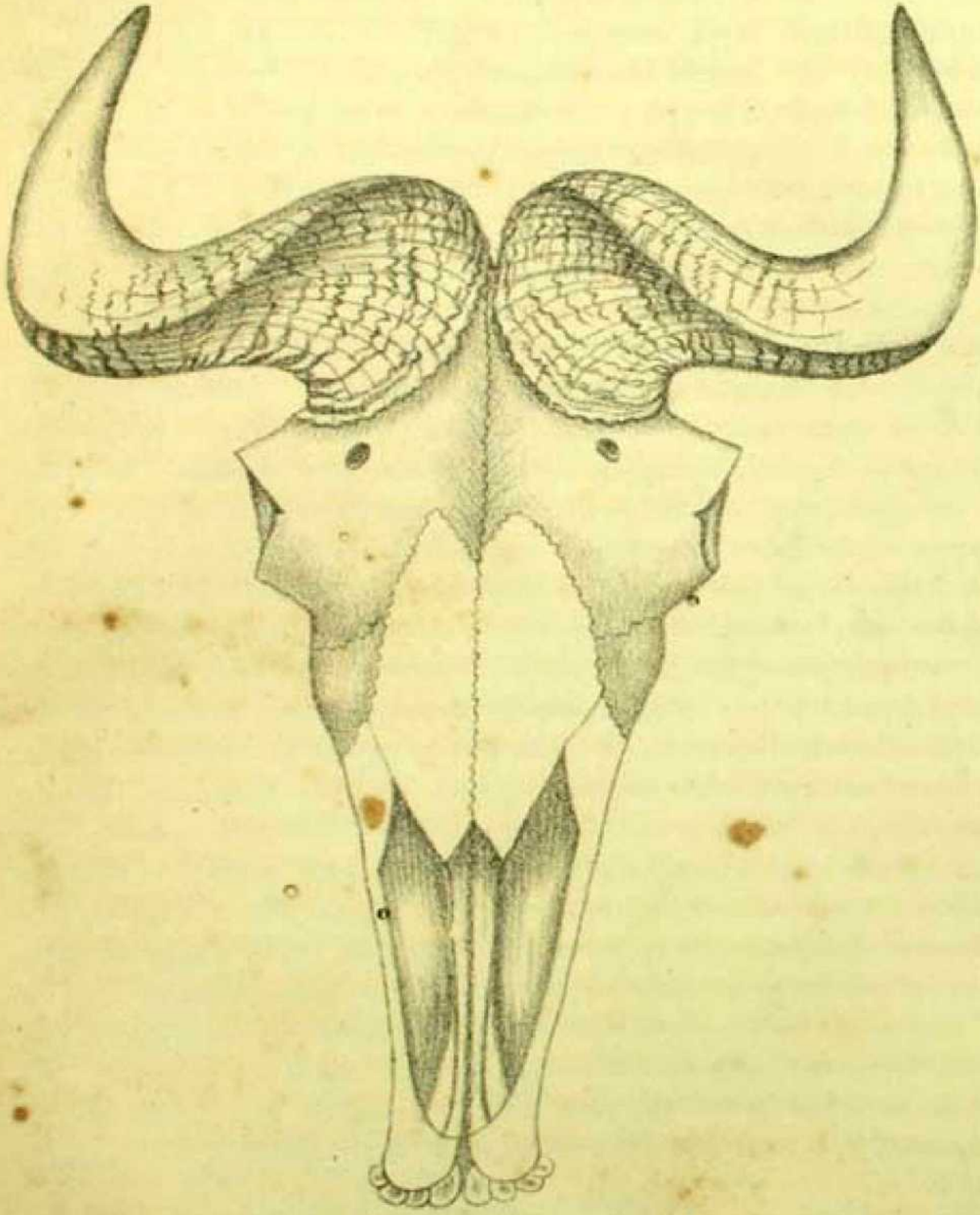
§ The recent discoveries of a great snowy chain and immense lake in this region, seem however to indicate that our heretofore notions of its climate and vegetation will soon receive material modification. As much might I think have been inferred from the size and numbers of its Herbivora, Darwin's reasoning of an opposite tenor seeming to me unsatisfactory.

system its place would probably be assigned between those two types. But before making further allusion to its affinities, I shall give a careful description of its appearance and structure, premising the account of them by a statement of what is known of its habitat and manners.

The Tákin tenants the Easternmost part of the Himálaya, or that which is adjacent to Yúnán, Sechuen and Khám. In the Himálaya it is stated to belong more especially to the Upper or Alpine region, but to be found also in the central region, though never in the lower region ;* and it probably extends its range from the Himálaya proper, to the proximate mountains of China and Tibet. The Tákin derives its high interest for the naturalist, not merely from its compound structure, made up, as it were, of the Ox, the Antelope, the Sheep and Goat, but also from its habitat, so remote and dissimilar from those of its allies. The Tákin is described as being an animal of high courage and great ferocity ; so that it cannot be taken alive, and is killed by the natives with much trouble and some risk. It is said to be very gregarious, though old males are sometimes found solitary ; but, for the most part, the species herd together in considerable numbers. Strength and ferocity are inscribed in very legible characters on the form and aspect of the Tákin, which is a much larger as well as bulkier animal than the lusty Caprine Antelope (Thár) of the Himálaya. The Tákin however reminds one in several respects of the Thár,† which it much resembles in colour as well as by its short Caprine tail, harsh adpressed hair, and vigorous make, suited to climbing these stupendous mountains. But the Thár is in structure as much more Antelopine as the Tákin is more Bovine. The latter is not much, if at all, inferior in size or bulk to the female Yák ; and, as seen from the front especially, with its lunate horns displayed and its short tail concealed, it would be at once pronounced to belong to the Ox kind, close examination alone being likely to suggest any doubts on that head. The Tákin, as I have said, is nearly as large, both in dimensions of extent and in bulk, as a female Yák ; and its massive form and peculiar proportions are quite Bovine. It is in length, from snout to vent, six and a half feet ; and in

* See J. A. S. No. 206. Phys. Geog. of Himálaya.

† Schinz in his Genera Mammalium has actually ranged this animal with the Gnoos. This is a mistake, but one indicative of remote affinity. The Thár is a typical Nemorhedus.—See J. A. S. No. 181, for July 1847.



BUDORCAS TAXICOLOR. N. G.

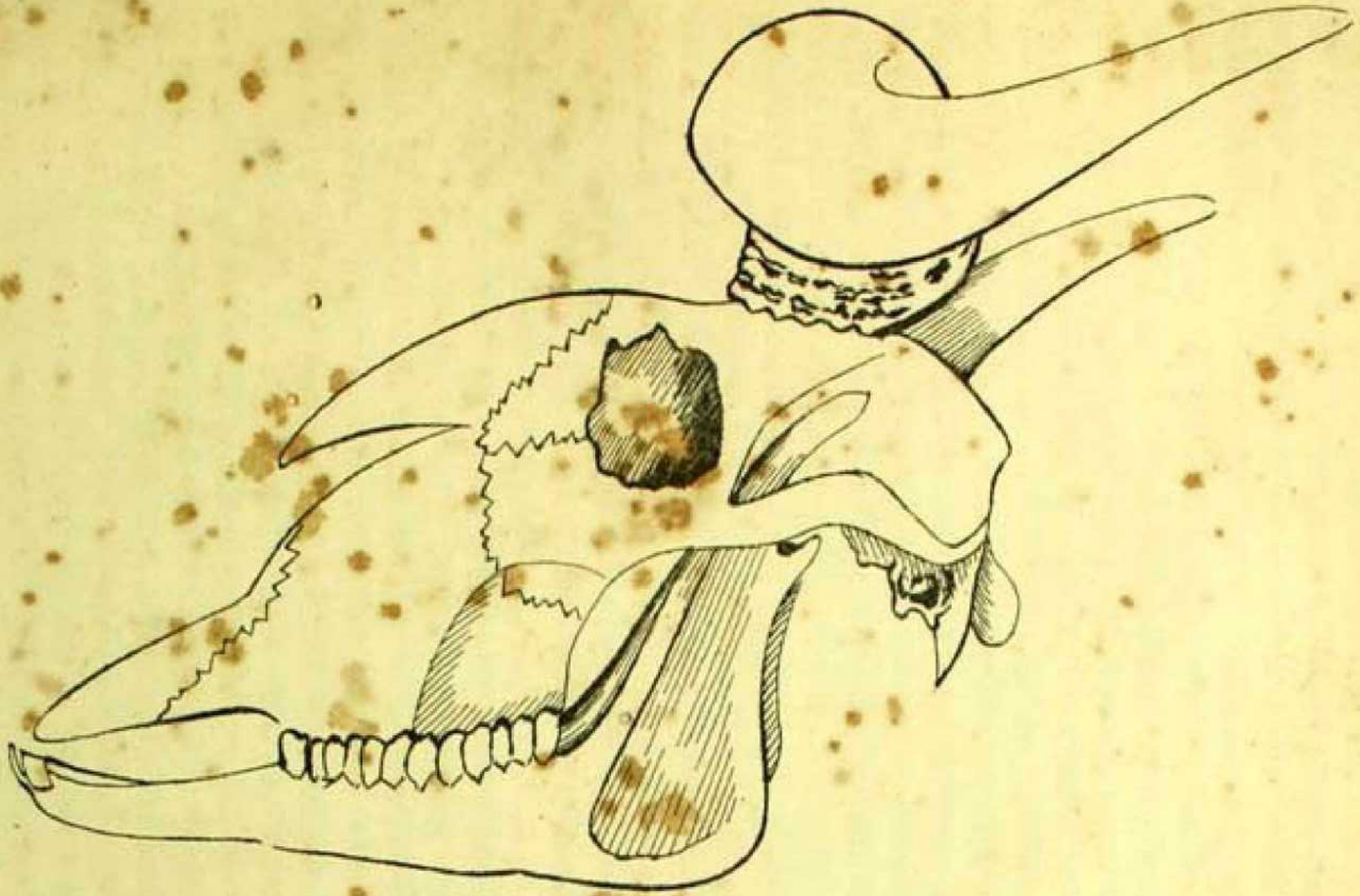
height, three and half feet at the shoulder. Its head is 20 inches. Its ears 5 inches. Its tail 3 inches, or 8 with the hair. The head is large and heavy, the neck short and thick, the body somewhat elongated but deep in the barrel, and yet more so in the shoulder, which is said to be raised in the Bisontine manner. The limbs are short, stout and Bovine, and so are the broad hoofs. In Tákin there is no approach to the Cervine limbs, or equine body and tail of the Gnoos; and the horns of the Tákin, which to a superficial view are round, smooth and lunate, would complete the impression of a Bovine animal, were not progressive attention almost necessarily now turned to the short narrow pointed ears, very short depressed tail, and hairy attenuated muzzle of our animal; particulars in which, with others to be presently mentioned, the Tákin deviates from the Bovine to approach the Ovine or Caprine type, and is sundered from the Gnoos in the same degree, that it is approximated to the Musk Oxen or Ovibos. But we must now describe the structure of our animal with more detail, and technical precision, from horn to hoof, and from nose to tail, how distasteful soever such descriptions may prove to the general reader.

The head of the Tákin is large, heavy and inelegant, exhibiting a mixed character, compounded of the Bovine and Ovine types. Its vertical dimensions (or height) are great, owing to the lofty curve of the nose and forehead, the chaffron being more romanised than even that of the Barwál (Ovis Baruál). But the length also of the head of the Tákin is considerable, and surpasses that of any Caprine or Ovine head, though inferior to the full normal length of head, characterising the Ox tribe. The head, though large and upon the whole perhaps Bovine, yet lacks the characteristic squareness of the Ox's head, both jaws being attenuated towards their anteal extremities much more than in the Ox, though somewhat less than in the Sheep and Goat. There is in the muzzle of the Tákin neither the nudity nor the breadth of that of the Ox and Gnoo, but on the contrary the lips are both tapered and clad with hair, almost as much as in the Goats and Sheep, and the animal is consequently a browser not a grazer. Nevertheless the mere nostrils, which are wide and terminal, have a decidedly Bovine character both as to form and position; and, as it were to remind us of the true Bovine muzzle, there is a clear broad margin round the nostril which is quite nude and moist. Whether the nostrils of the Tákin possess the Cato-

blepine valve cannot be determined with certainty from my specimens, but apparently that valve is proper to them. The lofty boomed chaffron exhibits no trace of the cartilaginous protuberance, or of the peculiar disposition of the hair, belonging to the Gnoos; nor is there in any part of the face of the Tákin any cuticular organ, gland or pore, whether suborbital, malar or intermaxillary. The high curvature of the chaffron is continued backwards between and beyond the horns, so that the whole head presents in profile the same egregiously beaked character, which Swainson,* has assigned to the Gnoo, though other representations of that species do not exhibit this peculiarity in the same prominent light. The eyes, which are of that medial size proper to Bos and Ovis, but distinctly smaller than in the typical Antelopes, are projected boldly from the sides of the head by the saliency of the orbits yet have a very lateral field of vision with little command of the prospect in front. Their position is high up in the head; that is, it is remote from the muzzle and close to the bases of the horns, as in the Ox and the Sheep (Ammon); and even more conspicuously so than in them. The horns also, as well as the eyes, have a backward position in the head, far from the muzzle but not equally proximate to the nape, owing to the characteristically Cervine or Antelopine development of the encephalon or brain-pan in the Tákin; a peculiarity diametrically opposed to the normal character of the Bovine head.

The horns of the Tákin are inserted on the highest part of the forehead, as in the Ox and Sheep, though not, as in them, at the posteal termination of the head; for the encephalon of our animal, as just noticed, spreads behind its horns in the manner of the Deer and Antelopes but more restrictedly. The Tákin's horns are attached, not to the lateral margins of the frontal crest, as in the Ox, but to its superior surface, as in the Antelopes, Goats and Sheep. Partly owing to the narrowness of the forehead in this its upper part—a narrowness contrasting remarkably with the Bovine breadth of frontals—and partly owing to the thickness of their bases, the horns are nearly in contact on the top of the head, but without actually touching. Their direction is first vertically upwards, then horizontally outwards or to the sides, then almost as horizontally backwards. Their basal portion, which has the vertical direction, is short and the rest of the length of

* Classification of Quadrupeds, 1. 276. Plate.



BUDORCAS TAXICOLOR, nov. gen.

the horns, keeping the horizontal course, is divided pretty equally between the laterally and posteally directed parts which curve into each other, so as to describe a bold lunate sweep with the pair of horns. In the females, which as well as the males are armed with these weapons, only of smaller size, the horns towards their points are approximated, and the points themselves turn towards each other. In the males however there is no such mutual inclination of the tips, but the horns, throughout their terminal halves nearly, run almost parallel to each other, and also in the main horizontally (in the ordinary position of the head), there being but a slight rise in that portion of the horns. The length of the horns is very moderate, being only twenty inches along their curves; but their robustness is great, and they are gradually attenuated from their thick bases. In their thick basal portion they are depressed and somewhat angular, but gradually become rounded. The basal section is trigono-ovoid with the wider and rounded edge turned obliquely forwards and outwards, and the narrower and cultrated edge or angle directed obliquely backwards and inwards. These narrow edges have the character of evanescent Caprine keels, which are turned towards each other over the nape; and the broad surfaces of the horns are for the most part the superior and inferior ones, but varying according to the course of the flexure. The basal depression of the horns, though marked, is less excessive than in Ovibos, and is void of tumidity or inflation, such as characterises the base of the horns in the Musk Ox and also in the Caffrarian Buffalo. The horns tend to a point which however is blunt not sharp. In their basal halves they are marked by numerous crowded rings, which go uniformly all round the horns parallelly and independantly of each other, and with perfect distinctness in youth though the annulation is apt to be more or less obscured in old males, by the rough uses these weapons are put to by them. The terminal halves of the horns are quite smooth. Thus, the horns of the Tákin are essentially Antelopine though seemingly Bovine, the compound flexure the annulation and striation being normally Antelopine characters; and the like is true of their osseous diagnosis, as will be seen in the sequel. The ears are short, narrow and pointed, with a decided Ovine or rather Caprine character, as in the Musk Ox, but not in the Gnoos. The neck is short and thick, being loaded with muscles suited to support the large and ponderous head, and which muscles are

no doubt aided in that office by tendinous ligaments attached to a high interscapular ridge, such as distinguishes Bibos, Bison, Damalis and no doubt also Catoblepas and Ovibos, though I do not find it specified by Ogilby or Smith or Swainson in regard to the two last forms. In the Tákin, which is our type of Budorcas, the true dorsal ridge is, I am assured, forthcoming; but not being possessed of a perfect skeleton, I cannot positively assert the fact, especially as this ridge, when regarded in the light of a generic character, results, not absolutely from the presence or absence of elongated spinous processes (for in that sense it is universal among the Ruminants), but only from the ordinary or extraordinary development of those processes. The barrel of the Tákin is elongated and deep, and the chest still deeper with elevated shoulders but not a slouching croup. The lusty limbs which exhibit the usual equality of length before and behind, are short, stout, rigid, bovine and terminate in broad hoofs, not less clearly modelled on the Ox type, but devoid of the several peculiarities distinguishing the Musk Ox's hoofs. The false hoofs are well developed and obtusely conical in shape. The short depressed triangular tail, has an entirely caprine character, and in this respect our animal differs remarkably from all its Damaline and Catoblepine allies, save only the Musk Oxen.

The hide is extremely thick and is pretty and uniformly covered with harsh straight adpressed hair similar to that of the Arná, and also of the Thár. It is of equable moderate length, save upon the pectoral surface of the neck whence depends a longer and mane-like fringe extending from the gullet to the chest, both inclusive, as in so many of the Damalines and Catoblepines, which, however, also exhibit a true or dorsal mane, as well as sundry facial tufts and vibrissæ, all of which are wanting in the Tákin. There is no peculiar disposition of the hair on the chaffron of the Tákin, nor are its lips or orbits any way specially bristley, as are those of the Gnoo. The females, as already noticed, are furnished with horns. The teats are four and are placed on an udder. There are no suborbital or other facial, nor any inguinal or interdigital glands or sacs; all important structural particulars whereby the Tákin manifests its departure from the Antelopine to join the Bovine group of animals.

We must now proceed to the osteology of our subject by describing its scull with as much care as we have employed in the above detail

of its superficial characters; but before so doing we must notice the colours of our animal, though this be a point of much less importance than ordinary books of Zoology would lead their readers to imagine. The entire body of the Tákin, both superiorly and laterally, is of a yellowish grey or Badger-colour, a circumstance whence we have derived its specific name (Taxicolor). The whole head and neck, with most part of the belly, the entire limbs and the tail, are black. Edge of the lips paled. A black list down the spine. The quantity of the grey colour of the body is variable, the whole animal being sometimes uniformly black, owing to the absence of the grey hue, which hue results from each hair (upon the grey parts) having its basal two-thirds, sordid yellow of a straw tinge, and its apical third, black. Hoofs, horns, and nude margin of nostrils, jet black. Hair on the body, $1\frac{3}{4}$ to 2 inches long; on the neck below, $2\frac{3}{4}$ to 3 inches; on the gullet, whence it depends like a beard, 5 inches and more. Females resemble males in colour as in characters; but they are smaller and have horns of less size and more or less mutually incurved towards their tips. The elongated hair of the males is likewise much less conspicuous in them.

The scull of the Tákin is exceedingly massive and heavy, the whole of the bones, having a thickness unparalleled in any Bovine animal I have seen, with the single exception of the Gour or Bibos gaurus, an animal whose scull likewise resembles that of the Tákin, in the extreme roughness of its whole surface. The Tákin's scull is distinguished by a compression and elevation more proper to Ovis than to Bos, but united with an elongation such as is found in the Bovines only. The culminal line of the scull, is throughout greatly but not uniformly curved, the uniformity of its arcuation, being somewhat interrupted by the rather abrupt rise of the frontals between the cores of the horns —a rise, however, not constituting a detached intercornual ridge, as in the Gour, but only an abruptish ascent of the frontals between the horns, somewhat in the manner of Ammon, and of other thick-horned Ovines such as the Barwâl. But in Ammon and Barwâl, as in all Bovines, the superior plane of the scull, together with its longitudinal development, terminate with the intercornual crest, whereas in the Tákin, as in the Deer and Antelopes, though in a less degree, the frontal and parietal bones are carried backwards behind the horns, so as to constitute an ordinary encephalon upon the upper surface of the

scull. Thus the nasal, frontal and parietal bones partake of the curvature proper to the whole superior surface of the scull; and that surface falls into the posteal and occipital surface by an angle much less acute and decided than in Bos or Ovis (Ammon), giving thereby to the scull of the Tákin a decidedly Antelopine (cervine) character quoad this important feature. The facial bones have a length intermediate between the Ovine shortness and Bovine elongation, and they terminate in front less broadly and squarely than in Bos, less narrowly and roundly than in Ovis. The lower jaw is nearly straight, so that the inferior line of the scull, partakes not of the arcuate form distinguishing its superior or culminal line. The nasals, not remarkable for defect or excess of length or of width, are signally so for their great convex curvature, both cross-wise and length-wise, so as, with the depth of the cheek bones, to leave a very ample cavity for the lodgment of the olfactory apparatus. On the other hand, the auditory cavity is extremely small. The frontals are far from possessing the same development, in length or breadth, before the horns or on the facial aspect of the scull, as distinguishes these bones in Bos, whose frontals are entirely developed anteriorly to the horns, and whose widely separated and moderately thick horns afford ample space for the lateral spread of the frontals, whereas the proximate and thick horns of the Tákin, reduce the width of the frontals, (which are but partially developed anteriorly to the horns,) in their upper part to an extreme degree of narrowness. From this narrowest and intercornual part, however, the frontals of the Tákin, widen rapidly forwards until between the very salient orbits, they have a breadth exceeding that of the frontals of O. ammon or of any Antelope, whose scull is accessible to me.

The curvature of the nasals is continued to the frontals, especially the transverse arcuation, which is signal between the orbits, but the arcuation length-wise is less marked and less uniform, owing to the cause above assigned. Indeed, between the cores of the horns and the orbits, the frontals are nearly flat, but recover their longitudinal and transverse convexity on passing backwards beyond the horns. The frontals are broader than long, as measured between the anteal edges of the orbits and the frontal crest, but nearly equal in length and width, if taken between their forward apices, and their junction with the parietal bone. The intercornual crest is very short, as already

remarked, and also straight, between the cores of the horns. The cores of the horns spring proximately and superiorly from the highest part of the frontals, having with regard to their culminal position an Ovine (Ammon) and Bovine character, but with regard to their proximity an anti-bovine but still Ovine character. The bone of which the horn cores is composed is not palpably porous, though it is by no means dense in structure; and there is, within the base of each core, a large but shallow sinus confined to the base, and communicating externally (the scull) with the supraorbitar foramina, and internally with the nasal cavity. The parietes have, as already remarked, a Cervine or Antilopine character, quite opposed to the Bovine type, but passing from the true Cervine to the abnormal Antilopine type as seen in the Goral (Kemas* goral) of these mountains. The orbits are signally prominent, more so than in any Bovine animal, save the Gour (Bibos gaurus), and equally so with the typical Antelopes such as Cervicapra Hodgsoni, &c.: but their direction is still quite lateral, owing to the equal development and projection of all parts of the external rim of the orbit, there being no obliquity to the front, nor any greater development of its posteal than anteal margin, in the orbitar ring. The margin of the orbits is extremely rugose all round. The lower jaw, as already noticed, has little upward curvature forwards, being nearly straight. Its posteal and vertical portion (coracoid) is much developed and the articulating surface or hinge of the jaws is consequently elevated far above the line of the upper molar teeth. Owing to the narrowness of the lower jaw in front, the incisor teeth are inserted in a curve as in Ovis and Capra, not rectilinearly to the front as in Bos. The teeth are $\frac{0\,0\,6}{8\,0\,6}$, there being no canines, and the usual number of molars and incisors. The molar teeth are large and occupy a greater space in the jaws than either in Bos or Ovis, and they are noticeable also for their length or elevation above the margin of the jaws. Their crowns have the usual obliquity outwards and the usual folds of enamel; but the saliency of the enamelled ridges is specially observable, independently of youth. The incisors lean less forwards or outwards than in Bos, more so than in Ovis (Ammon), and their crowns have a medial degree of obliqueness or slope inwards.

* See J. A. S. No. 181, for July, 1847.

The dimensions of our animal and of its scull are as follows :—

	Male.			*Female.*		
Length from snout to vent,	6	6	0	6	0	0
Height at the shoulder,	3	6	0	3	0	0
Length of head, to frontal crest,	1	6	0	1	4	0
Length of ears,	0	5	½	0	5	0
Length of tail only,	0	3	0	0	2	¾
Length of tail and hair,	0	8	0	0	6	0
Length of horns by curve,	1	8	0	1	2	½
Basal girth of horn,	1	0	0	0	9	½
Basal interval of horns,	0	0	⅜	0	0	½
Terminal interval of horns,	1	0	0	0	6	½
Length of fore-hoof, along sole,	0	4	½	0	4	0
Width of ditto ditto,	0	3	½	0	3	0
Height of ditto, oblique, to end of toe,	0	3	0	0	3	0

Scull of Male.

Length from parietes to symp : intermax : straight,	1	6	½
Ditto, from crest of frontals to ditto,	1	5	¼
Height extreme,	0	10	0
Length, extreme, of lower jaw,	1	1	½
Length of series of lower jaw grinders,	0	5	¼
Length of largest grinder of lower jaw,	0	1	⅜
Width of ditto on crown,	0	0	½
Length of nasal bones,	0	6	½
Length entire of frontals from anteal apices to parietes,	0	6	⅝
Length of frontals from fore-angle of orbits to frontal crest,	0	4	⅝
Width of forehead between nearest angles of orbits,	0	6	¼
Ditto between widest angles of orbits,	0	7	¾
Diameter of orbits,	0	2	¼

P. S. In the above account of a most interesting animal, which is clearly the type of a new genus of the Bovine Antelopes, or Budorcine Sub-family of the Bovidæ, I have purposely avoided throwing my facts into the mould of a generic character, with reference to the unsettled state of information and opinion regarding the group of which the Tákin is a very characteristic, and I think the most characteristic type. But, whoever shall have priorly adjusted the characters of the Sub-family with those of its included genera, must find the selection of

significant particulars for a generic (and specific) character of Budorcas, from the above ample and careful account of our animal, the work merely of five minutes.

Since the above paper was written, I have received from Major Jenkins a very neat model in wood, and coloured, of the Tákin. The model is the work of the native chief, who slew, and presented to Major J. the animals whose spoils formed the materials of my description. This model is very neatly executed, and is a surprising sample of Mishmi ingenuity. It confirms my description, as to figure but not quite as to colour; for, there is a white half-moon mark on the top of the forehead, and the grizzled hue of the body is confined to the back, the flanks as well as the rest of the carcase and limbs, being black. This model pourtrays a male of mature age and presents to view an animal of more than Bovine bulk and massiveness, with an elongated deep body, high shoulder, thick bull neck, immense head not much boomed on the chaffron, and short rigid Bovine limbs supported on broad hoofs. With the model, came to me some sketches of scenery due to the same dexterous hands. These sketches lead one to infer that the country frequented by the Tákin, abounds in vegetation arboreal and other. The trees are numerous, large, and many of them, conifers.

A Third Notice on the Ball Coal of the Burdwan Mines.—*By* Henry Piddington, *Cur. Mus. Eco. Geology.*

The two previous notices on this singularly formed coal, will be found in the Journal, Vol. XVII. p. 58, for January 1848, and in Vol. XVIII. p. 413, for April 1849.

I have now through the kindness of Mr. Homfray, been enabled to see a large heap of it at Howrah as brought from the mines; and to a valuable collection of choice specimens which he had put by, he kindly allowed me to add such as I chose to pick from the heap. Mr. Theobald, Junior has also sent to the Museum a basket full of the balls.

We have thus at length an abundance of this remarkable variety of coal, and it is impossible to examine it in the mass, and in detail, without at once being satisfied that, as I conjectured in my second notice, this is neither more nor less than coal softened by heat, and taking when cooling this concretionary and semi-concretionary form and in some instances, perhaps, indeed in the whole mass when seen *in situ* it has adopted the semi-columnar appearance with a true ball and socket joint, like basalt. One of Mr. Homfray's specimens indeed, is a most splendid and perfect instance of this, being a fragment of what we might term a carbonaceous shaft 7 or 8 inches in diameter, with a complete ball and socket articulation! Mr. Theobald in his note says that "the seam in which the ball coal is found at Kumárcolly including some partings, is 40 feet and upwards in thickness," he farther adds "I should attribute the globular structure to a partial change which in many places is effected by trap dykes."

The larger balls are dull exteriorly, and marked with the alternate bands of bright and dull coal of the mineral in its massive state, but the glance (of the surface) brightens as the balls decrease in size, till the very small ones of the size of an egg or a walnut become perfectly bright and highly polished; and in these all external trace of the lamination* of the coal has disappeared. I have found in none however any of the pavoine lustre so common in the Anthracites.

In the fracture of the small balls, traces of the lamination are at times to be found; but generally these balls may be described as composed of minute, irregularly set laminæ, very bright and specular like bright coal or coke-dust cemented or half melted together.

The balls are rather tougher than the matrix coal.

Whether in mass or in powder it swells considerably in the crucible, and the coke is excessively slow and difficult of incineration and it has the peculiarity of forming over the lamp, and in an open crucible a kind of coke which must be pulverised to reduce it to ash in any moderate time. It perfectly resembles in this respect the Anthracite which seems to have its carbon in a state approaching to that in which it exists in Plumbago.

* By the lamination I mean the alternate bands of dull and bright Coal which all our Indian Coals have, and which is found also in many European kinds of Coal.

The following are the analysis of the matrix and of a perfect ball from it.

	Ball.	Matrix coal.
Sp. gravity, ...	1.32	1.34
Gaseous matter, ...	24.00	28.00
Carbon,.....	68.75	59.60
Ash, ...	7.25	12.40
	100.00	100.00

It would thus appear that the purest parts of the coal, i. e. those containing the least proportion of earthy and metallic matters, are those most liable to affect the globular form and this explains, in one way at least, the occurrence of the small bright balls close to those ten times their size, for we may suppose them to have been originally the remains of some vegetable with less earthy matter in their composition. I shall send home a good supply of specimens, and I trust we shall thence obtain some good microscopic examinations of it.

Note presented by H. Torrens, *Esq., C. S., Resident, Moorshedabad, with a specimen of Iron from the Dhunakar hills, Birbhúm.*

This specimen of the iron smelted by the Sontals of Birbhúm, was procured by Dr. Robert Young near a place called Bullia-narainpur below the Dhunakar hills about thirty miles, as the crow flies from Moorshedabad. The country is described as covered with an interminable Saul forest, of which the larger trees appeared to average about two feet diameter. The small shafts sunk throughout the country by the Sontals for "*iron earth*," as they call it, are astonishingly numerous. The forest furnishes them with excellent charcoal, and they are singularly careful to cut the timber for it in regular patches of about a *bigáh* in extent, driving the shaft of their little mine often between

the trees, destined to smelt its produce. The expanse thus cleared is abandoned for a regrowth of the Sauls. The furnace or *chulá* is of clay, about 3 to 3½ feet broad, and each is served with three large bellows worked by the feet; the heat produced is considerable. The ore undergoes a second, and sometimes a third smelting, and the iron is called the best in India. The price on the spot is 3 Rs. a maund.

The Sontals of these forests are described as a hardy but not a comely race, eating like the Dhángars, rats, snakes and any vermin; they are equipped with bow and arrow wherever they go, and let nothing alive escape them. Animal life there is consequently little of, although the barren character of the forest, and the scarcity of water, must also account in a measure for this. Spotted deer (the *Axis* of Buffon) and two bears were shot by my informants, but the animals seemed to have all what is termed a great deal of *travel* in them, as with creatures used to roam far for food. The Sontals are handy in devising and constructing implements. Their cart is chiefly of hewn Saul wood, the wheels being solid, and the whole constructed of wood alone. The knife they use for cutting food is of a very hard wood, not procurable in that part of the country. They were not observed to have the bamboo at all in use.

I think the peculiarity of using wooden articles, even to the knife, in an *iron* country is as remarkable a fact as I have met with in India. The explanation is most likely to be found in some superstition connected with the desecration of the staple they live by, if used by them for vulgar purposes of common life. An analogous idea of *reverence for the thing they use or live by*, may be traced largely throughout Hindu society, from the silkworm tender, who preserves a diet, lives single, and neither washes nor shaves during the production of the cocoon, to the writer who worships his inkhorn, and the champion *(pahlwán)* who will not lift his two-handed sword *(báná)* till he has salaamed to it. This consideration might be followed out in an exposition of what may be termed "the philosophy of idolatry."

Notice of a Trip to the Niti Pass. By Lieut. R. STRACHEY. *Communicated by order of the* HON'BLE THE LIUET.-GOVERNOR, *N. W. P.*

I returned here some days ago from Nití, and although I have not much in the way of personal narration to give, all that I expected has, I believe, been done. I reached Nití early in July, having as I passed Joshináth (at the union of Dáuli and Vishnuganj) set up a Barometer, &c. there with a rain-gauge. These have been regularly registered from the end of June, till the middle of October, as also have a similar set of instruments at Nití. At both places, the registers were kept by natives of Almora whom I took up with me. About a week after my arrival at Niti, I started on my first expedition. My route you will see from the accompanying sketch map. The old map showed none of this and my brother's map was likewise quite wrong, so it was not till I had been over the ground that I got a clear idea of the geography of this part of the country. I went viâ Marshak pass 18,500 ft. to Raj-hote, there visited the pass into Tibet called Tumjun-la 16,500 and went down the river from Raj-hote as far as it was practicable, returning to Nití by Chor-hoti pass 17,500. You will see that this valley of the Raj-hote river exactly corresponds to those crossed on the road, from Milam into Hundes, the Marshak and Chor-hoti passes being the parallel of Unta-dhura, and the identity is still further shown by the geological structure of the mountain ranges. During this and my subsequent journey, I collected a considerable number of fossil shells which I have no doubt will enable competent geologists to decide fully on the age of the strata in which they were found. I can only venture on generalities.

Shortly after my return to Nití, I was joined by my brother Henry from Ladak, who came viâ To-ling and the Nití pass without meeting with any obstruction. He remained with me till my return here. With his help I began horary meteorological observations at Nití, which were continued without interruption for six days, by which time it had become clear that the law of the hourly variations had been sufficiently developed. About the first week in August, after these observations had been completed we started together for the Nití pass,

with the intention of undertaking a series of meteorological observations in the plain of Hundes, and also hoping to be able to fix the position of Kailás and Gurlá, and generally to improve the old map of Hundes, by trigonometrical operations, based on the great snowy peaks, the positions of which have been fixed by the G. T. Survey. I may as well at once go on to say that this has been done, and that the new survey has enabled me to draw out with a fair degree of accuracy, my survey work of last year, and the determination of the positions of Kailás and Gurla will equally add to the value of my brother's first rough survey of his route to Mánasarowar. The greater part of this work has been drawn out, and a reduced copy, 8 miles to an inch, will be begun by my brother directly, which shall be sent to you as soon as it is finished. This map will serve to illustrate the account of my last year's trip into Hundes, as well as this year's operations near Niti. I intend to set about writing them directly, the former being already drawn out in the rough.

The day after we crossed the Nití pass, we were met by people sent to look after us by the Zungpun of Dábá; they however talked in the meekest possible way, and only asked where we were going. This we explained, and next day we fixed on a place at which to encamp for the meteorological observations which were at once begun. The following day the Zungpun himself appeared in company with a man, who it seems had been sent from Gartok (on the news of my having settled at Niti having reached that place), specially to look after me, and likewise to keep the Zungpun up to his work, in preventing my entry into Hundes.

They asked permission to visit us, to which we of course assented at once. The interview began by their saying that we must be off instantly; to which we replied, that we intended to remain until we had completed the work for which we came unless turned out by the Zungpun. After much talk they by degrees abated in their demands, and from granting one day and then two, at last when they saw that we were utterly obstinate, ended by saying, that our proposal to go when we had done what we wanted, was quite satisfactory. It was understood, however, that we were not to go to Dábá or Dungpu. We told them indeed plainly, that we only intended to go on 4 or 5 miles to some hills from the summit of which we wished to take angles. The

weather, which for the first few days of our stay in Hundes had been fine, became abominable, and a good deal of rain fell, extending as far as we could see, over the whole plain of Guji, and covering the mountains north of the Sutlej with snow. I may as well note here that the plain of which I talk, the existence of which Capt. J. Cunningham doubts, was crossed in the direction of its length by my brother on his way from Ladak. It is I fancy 100 miles long, and where broadest 40 or 50 miles, and it is very distinctly seen from the vicinity of Nití pass extending in a N. Westerly direction to a great distance. We had encamped at the foot of a mountain, the top of which was about 18,000 ft. above the sea, and which we had fixed upon as one of our survey stations, our camp was at about 16,500 ft., which is I think very near the limit of possibility for a permanent camp in this region. We waited quietly here—the place is called Lanjar,—till the weather cleared up, which it did in course of time. The Zungpun remained in camp with his tail within a quarter of a mile of us, occasionally stirring us up to go; but he was not taken much notice of. The first fair day, however, we went up the mountain and remained there the greater part of two days and one night, during which the angles that were wanted were taken and horary meteorological observations made for a period of 24 hours, also of Magnetic Dip, &c. When this was done we moved on to the Lung-yung hills to complete the triangulation that was to fix the position of Kailás and Gurla. The Zungpun did not think it worth while to follow us, though we had, in reality, gone so close to Dábá and Dungpu, that he could not have prevented our going to either place, if we had been so disposed; indeed it looked very much as though his waiting till we moved was a mere pretence to take in his own superiors. There can be little doubt that at the bottom of all this non-interference with us, was the utter impossibility of his doing any thing if he had wished it. At that time there were, I believe, in Dábá, more British subjects than Tibetans; and although there has hitherto been a sort of impression, that our people were afraid of the Tibetan authorities, and therefore declined to take English travellers into Hundes, the result of this last expedition has been to prove most satisfactorily to me that this is utterly unfounded. Indeed, the whole of this part of Tibet is absolutely at the command of our Government, for by stopping the export of grain across the frontier the

whole of Guji would be starved, and of this they must be just as well aware as we, and no doubt far better. It is perhaps hardly probable, that it will ever be worth the while of the British Government to coerce that of Lassa; but if it be, I should conceive that closing the frontier would most effectually bring them to reason.

Having concluded our operations at Lung-yung we returned viâ Shelshel, Raj-hoti and Chor-hoti passes to Nití, which we reached early in September, having satisfactorily cleared up the doubtful points in the geography of this part of the mountains.

I had determined to remain at Nití till the end of September, in hope of getting fine weather, and of being able to make another ascent to some considerable height. The bad weather towards the end of the month, however, disappointed me in this, and I was at last at the beginning of October, only able to get up to about 14,700 ft. down to which the mountains were covered up with snow. Between this elevation and Nití (11,500) corresponding Barometrical observations were made by my brother and self, and the difference of height was also measured by the Theodolite, for the purpose of testing the formula by which heights are calculated from Barometrical observations.

We left Nití on the 10th October, and came straight down here only stopping a few days on the road, to make another similar set of Barometrical observations between heights of 10,500 ft. and 5,500 ft.

In the history of this year's work I shall explain the nature of our Trigonometrical operations, from which any one who wishes to do so may see the data on which our position of Kailás rests.

PROCEEDINGS

OF THE

ASIATIC SOICETY OF BENGAL

FOR DECEMBER, 1849.

THE usual monthly meeting of this Society was held at the Museum on Wednesday, 5th December, 1849.

The Hon'ble Sir J. W. COLVILE, President, in the chair.

The proceedings of the former meeting having been read and confirmed, and the accounts of the past month laid upon the table, the Secretary stated that the following gentlemen had intimated their wish to withdraw from the Society; viz., G. Hill, Esq., C. J. S. Montague, Esq. G. R. Wilby, Esq., W. Taylor, Esq., James Corcoran, Esq., and John Muller, Esq.

The following gentlemen were candidates for election:—

J. J. Gray, Esq. Maldah, proposed by J. W. Laidlay, Esq. seconded by Rev. Mr. Long.

J. C. Marshman, Esq., proposed by J. W. Laidlay, Esq. seconded by the Hon'ble Sir J. W. Colvile.

A communication was read from W. Grey, Esq., Under Secretary to the Government of India, forwarding at the request of the Government of Van Dieman's Land, a copy of the Rules and the proceedings of the Royal Society of that Colony, together with the following extract of a letter from J. E. Bicheno, Esq., Colonial Secretary, dated 19th July, 1849.

"The Council of the Society solicit me to express the earnest wish on their part for the establishment of a direct system of intercourse,

mutual co-operation, and interchange of publications and of the productions peculiar to India and this colony; a system of reciprocity which it is manifest must tend to further the interests, views, and objects of all such associations."

It was resolved that the Society express their willingness to concur in such co-operation so far as practicable, and that the Secretary forward to the Royal Society of Van Dieman's Land a copy of such volumes of the Society's Journal and Researches as may be available.

Read a letter from W. Seton Karr, Esq., Under Secretary to the Government of Bengal, presenting on the part of Government, a highly finished map of the district of Balasore for the use of the Museum of Economic Geology.

From the same, forwarding for deposit in the library of the Society, a copy of M. Eugene Burnouf's edition of the Bhagavat Purána.

This superb specimen of typography, unquestionably one of the finest editions of an oriental work ever published, excited the warm admiration of the meeting. The best thanks of the Society were ordered to be returned for this donation.

From Capt. F. C. Minchin, Private Secretary to his honor the Lieut.-Governor, North-Western Provinces, forwarding for publication in the Society's Journal, an interesting letter from Lieut. R. Strachey, giving a brief sketch of his recent meteorological and geographical observations at Niti and its neighbourhood.

From Dr. H. Falconer, enclosing a letter from Dr. Asa Gray, Corresponding member of the American Academy of Arts and Sciences, Massachusetts, presenting to the Society a copy of the proceedings of that Academy.

From Dr. A. Weber, presenting a copy of the first number of the first part of his edition of the Vájasaneya Saṇhitá published in Berlin.

From Henry Torrens, Esq., V. P. protesting in the strongest terms against the dismissal of the Mauluví, in whose charge the Arabic and Persian books and manuscripts had until lately remained. Mr. Torrens pointed out the extreme care requisite for the proper preservation of such works, and offered, rather than any risk of injury should arise from the dismissal of the Mauluví, to maintain that officer at his own charge; if the Society would sanction his re-appointment.—The Secretary was directed to explain to Mr. Torrens that while the Council of

the Society fully appreciate the advantage of retaining on their establishment a Muhammedan scholar, in the appointment of the late Mauluví, they felt that the financial position of the Society rendered his removal, for the present at least, a measure of necessity. At the same time the preservation of the Society's library was by no means neglected, being entrusted to the Society's librarian, Bábu Rájendralál Mittra.

A valuable paper by B. H. Hodgson, Esq., on the Physical Geography of the Himalaya, accompanied by a map, was laid before the meeting; but as it is already printed in the number of the Society's Journal now nearly ready for issue, it was not deemed necessary to read it in extenso.

Read a short note by Henry Torrens, Esq., on Native Impression regarding the natural history of certain animals.

From Captain Newbold, forwarding a paper by Hekekyan Bey describing the strata bored through in searching for coal in Wádi Arába in the eastern desert of Egypt, with an introductory note by himself.—Ordered for publication in the Journal.

Several other communications of no public importance having been read

The Rev. Mr. Long brought to the notice of the meeting the loss the Society had sustained by the death of Dr. Hæberlin, who had been an active member for many years and proposed the following resolution, which was carried unanimously.

"Resolved,—That the Society desire to record the sense that they, as well as the cause of Sanskrit literature, have sustained by the death of Dr. Hæberlin."

The Secretary having brought to the recollection of the meeting the proposal of the Council in the recent Financial Report, that a Committee be appointed to pass the monthly accounts, it was

Resolved,—That a Finance Committee be appointed at the ensuing annual meeting, to audit the monthly accounts.

The Secretary laid before the meeting an Atlas and a skeleton map of the Chinese territories in Central Asia, drawn up from very recent Chinese authorities. These maps exhibit the topography of these countries in much detail, rendering it easy to trace the routes given in Von Humboldt's *Asie Centrale*, that of Mir Izzat Ulláh, Sekander

Beg, &c., as well as those of early European travellers and Chinese pilgrims.

The Zoological Curator and Librarian having read their monthly reports, the meeting adjourned.

LIBRARY.

The following books have been added to the Library since the last meeting.

Presented.

Chronicon Samaritanum, Arabice Conscriptum, cui titulus est Liber Josuae. Ex unico codice Scaligeri nunc primum edidit, Latine vertit, annotatione instruxit, et dissertationem de codice, de Chronico, et de quaestionibus, quae hoc libro illustrantur, praemisit Th. Guil. Joh. Juynboll. Lugduni Batavorum 1848, 4to.—PRESENTED BY THE CURATORES ACADEMIAE LUGDUNO BATAVAE.

The Dodo and its kindred ; or the history, affinities and osteology of the Dodo, Solitaire, and other extinct birds. By H. E. Strickland, Esq. and Dr. A. G. Melville. London 1848, 4to.—PRESENTED BY H. E. STRICKLAND, Esq.

Les Seances de Haidari, recits Historiques et Eligiaques sur la Vie et la Mort des principaux Martyrs Musulmans, ouvrage traduit de l'Hindustani, par M. l'Abbe Bertrand; suivi de l'Elegie de Miskin, traduit de la meme langue, par M. Garcin de Tassy. Paris 1845, 8vo.—BY THE TRANSLATOR.

Memoires de la Societe Royale des Antiquaries du Nord, 1845-47.—BY THE SOCIETY.

Guide to Northern Archæology by the Royal Society of Northern Antiquaries of Copenhagen ; edited for the use of English readers by the Right Hon'ble the Earl of Ellesmere. London 1848, 8vo.—BY THE ROYAL SOCIETY OF NORTHERN ANTIQUARIES.

Bulletin de la Societe de Geographie. Troiseme Serie, Tome IX.—BY THE SOCIETY.

Journal of the Royal Geographical Society of London, Volume 18th, Part II.—BY THE SOCIETY.

The Calcutta Christian Observer, Sept. @ Dec. 1849.—BY THE EDITORS.

The Oriental Christian Spectator for July, Sept. and Nov. 1849,— BY THE EDITORS.

The Oriental Baptist, Nos. 33—6.—BY THE EDITOR.

Upadesáka, Nos. 33—6.—BY THE EDITOR.

The Journal of the Indian Archepelago, Vol. III. Nos. 6—9.—BY THE EDITOR.

Ditto Ditto (2 copies).—BY THE GOVERNMENT OF BENGAL.

The Languages of the Indian Archepelago. No. 1. A system of Classification and Orthography for Comparative Vocabularies. By J. R. Logan, Esq. (Pamphlet).—BY THE AUTHOR.

A letter to K. of the Benares Magazine, touching novel opinions on Indian Logic; with strictures upon certain portions of the Lectures on the Nyáya Philosophy, printed for the use of the Benares College by order of Government N. W. P. Allahabad 1849, (4 copies).—BY THE AUTHOR.

Tattvabodhiní Patriká, Nos. 73—5.—BY THE TATTVABODHINI' SABHA'.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of July, Augt. Sept. and Oct. 1849.—BY THE DEPUTY SURVEYOR GENERAL.

Denkschriften der Koniglichen Akademie der Wissenschaften zu Munchen, Vols. I. II. III. IV. VI. VII. IX. (2 copies)—PRESENTED BY THE ROYAL ACADEMY OF MUNICH.

Abhandlungen der Akademie der Wissenschaften, part II. of Vols. XIX. XX. XXI.—BY THE SAME.

Bullietin der Akademie der Wissenschaften fur das Jahr 1843-4-5-6.—BY THE SAME.

Gelehrte Anzeigen, Bands XXII. XXIII.—BY THE SAME.

Almanach der koniglichen bayerischen Academie der Wissenschaften fur das Jahr 1847.—BY THE SAME.

Systema Materiae Medicae Vegetabilis Brasiliensis composuit. Car. F. P. de Martius, Lipsiae, 1843.—BY THE AUTHOR.

Súsrutas Ayurvedas. Id est Medicinae systema a Venerabili D'hanvantari demonstratum a Susruta discipulo compositum. Nunc primum ex Sanskrita in Latinum sermonem vertit, introductionem, annotationes et rerum indicem adjecit Dr. F. Hessler.—BY THE AUTHOR.

Die Ueberbleibsel der altagypteschen Menschenrace. By Dr. Fransz Pruner.—BY THE AUTHOR.

Uber das studium der Griechischen und Romischen Alterthumer. By Ernest von Lasaula.—BY THE AUTHOR.

Bhagavat Purâna, traduit et publie par E. Burnouf, 2 vols. fol.—BY THE EDITOR.

Ueber die Ordalien bei der Germanen in ihrem Zusammenhange mit der Religion. By G. Phillips.—BY THE AUTHOR.

Die Galvanographie, eine Methode, gemalti Zuschbilder durch galvanische Kupferplatter im Drucke zu vervielfaltigen von Fransz von Robell.—BY THE AUTHOR.

Transactions of the Bombay Geographical Society from 1837 to 1848, 6 volumes, 8vo.—BY THE SOCIETY.

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Memoirs of the American Academy of Arts and Sciences, Vol. III. (2 copies).—BY THE ACADEMY.

An account of the Measurement of Two Sections of the Meridional Arc of India, by Lieut.-Colonel Everest.—BY THE GOVERNMENT OF INDIA.

Transactions of the American Ethnological Society, Vols. I. II.—BY THE SOCIETY.

The Whole Works of the most Rev. James Usher, D. D. Vol. XVI.—PRESENTED BY THE PROVOST AND SENIOR FELLOWS OF TRINITY COLLEGE, DUBLIN.

Hekâët Abdullah bin Abdul Kâder, (in Javanese), Singapur 1849, 4to.—BY THE GOVERNMENT OF BENGAL.

The Vâjasaneyi-Sanhita of the Mâdhyandina and the Kânva Sakhas with the Commentary of Mahidhara. Edited by Dr. Albrecht Weber, Berlin 1849, 4to.—BY THE EDITOR.

History of the Sikhs, by Capt. J. D. Cunningham.—BY THE AUTHOR.

An Analytical Digest of all the Reported Cases decided in the Supreme Courts of Judicature in India. By W. H. Morley, Esq. Part 5 of Vols. III. —BY THE GOVT. OF BENGAL.

Yesu Christa muhatmya, in Sanskrita and Bengali.—BY THE REV. J. LONG.

Memoir on the Statistics of the North-Western Provinces. By A. Shakespear, Esq.—BY THE GOVT. OF THE N. W. PROVINCES.

On Foraminifera, their organization, and their existence in a fossilized state in Arabia, Sinde, Kutch, and Khattywar. By J. Carter, Esq. C. S.—BY THE AUTHOR.

The Holy Bible, London 1619, 4to.—BY J. P. PARKER, Esq.

Zakarija bin Mohammad bin Mahmud el Cazwini's Kosmographie. Erster Theil. Die Wunder der Schopfung: edited by Dr. Austenfield, Gottingen 1838, 8vo.—BY THE EDITOR.

Zeitschrift der Deutschen morgenlandischen Gesellschaft, herausgegeben von den Geschaftsfuhrern. Zweiter Band, IV. heft, and Dritter Band, 1 heft. —BY THE EDITORS.

Exchanged.

Journal Asiatique, Nos. 59, 60.

The London, Edinburgh and Dublin Philosophical Magazine, Nos. 225—30.

Jameson's Journal. Nos. 91, 92.

Athenæum, Nos. 1126-38-40.

Purchased.

The Apostolical Constitutions, or Canons of the Apostles in Coptic. With an English Translation by H. Tottam, L. L. D. London 1848, Rl. 8vo.

Comptes Rendus, Nos. 18—21. Tome XXVII. and Nos. 1—5, Tome XXVIII.

The Annals and Magazine of Natural History for June, July, Augt. and Sept. 1849.

Journal des Savants for May, June and July, 1849.

North British Review, No. 22.

Museum of Curiosities.

Eight reed Arrows tipped with iron; from Birbhum.—PRESENTED BY G. H. J. TAYLOR, ESQ.

Report of Curator, Zoological Department.

The following are the donations which have been received since the last meeting of the Society.

1. From C. Huffnagle, Esq. The carcass of a young male Rhinoceros,

2. From R. W. G. Frith, Esq. The carcass of a bull Gayal, *(Bos frontalis)*. These two large animals are in process of being mounted for the museum.

3. Capt. W. S. Sherwill, 66th N. I. A small collection of skins of mammalia, birds, and carapacis of two species of land Tortoise, also a *Balistis*, and two species of a Tetradon, from Cape of Good Hope. This collection comprises some fine specimens of the *Hyrax capencis*, adult males, females, and young; with some other species new to the Society's collection.

4. W. Theobald Esq., Junior. A collection of birds' eggs, chiefly British.

E. BLYTH.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of January, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	..	..	..	..	....	....	..	..	..	..	....	..	..	..	..	..	....	....
2	38.047	58.0	59.3	57.2	Calm.	Clear	30.100	68.4	70.2	63.2	N.N. E.	Clear	30.057	77.6	76.7	65.8	N.	Clear
3	.062	60.0	60.8	59.3	Do.	Foggy	.110	70.4	71.6	64.9	E.	Cirro-strati	.058	78.2	77.4	67.7	N.	Cirro-strati
4	.058	61.2	61.6	60.6	Do.	Ditto	.131	70.2	70.8	64.0	E. N. E.	Ditto	.067	77.3	75.4	66.3	N. W.	Ditto
5	.043	63.0	62.9	60.0	Do.	Cirro-strati	.093	68.9	69.7	63.0	N. E.	Ditto	.042	76.9	77.0	66.3	N.	Ditto
6S	.084	60.8	61.0	59.2	N.	Ditto	.127	68.0	67.9	63.7	N.N.W.	Ditto	.069	74.6	73.3	66.2	N.N.W.	Scatd. Clouds
7	.065	59.1	69.2	58.4	N.N. W.	Ditto	.113	69.4	69.0	63.3	Do.	Cloudy	.058	72.3	72.0	65.3	N.	Cirro-strati
8	29.963	61.4	61.8	59.3	N.	Ditto	.019	68.8	69.0	63.3	Do.	Cirro-strati	29.958	74.0	73.2	65.1	N. W.	Ditto
9	.915	58.0	58.9	56.9	Calm.	Cirro-cumuli	29.968	67.8	67.8	61.0	Do.	Cloudy	.898	71.1	69.9	60.3	N.	Cloudy
10	.892	55 0	55.0	53.8	Do.	Clear	.972	68.2	69.4	61.2	N.	Clear	.916	75.2	74.3	63.3	N. W.	Clear
11	.925	58.0	58.9	57.2	Do.	Ditto	.982	70.1	72.0	65.2	Do.	Ditto	.932	79.2	79.0	68.0	N. N.W.	Ditto
12	.943	61.8	62.1	61.2	Do.	Ditto	30.017	73.0	75.0	69.7	N. E.	Ditto	.975	81.0	80 5	..	N. W.	Ditto
13S	.971	65 0	65.4	63.8	N.	Cirro-cumuli	.065	69.2	69.0	65.2	N.	Cloudy	30.026	71.7	71.2	66.0	N. W.	Cloudy
14	30.002	61.2	61.3	57.2	N.	Ditto	.052	66.3	66.3	61.0	Do.	Cirro-cumuli	.009	71.8	70.4	61.6	N.	Cirro-cumuli
15	29.960	60.8	61.0	58.9	N. E.	Ditto	.050	66.3	66.3	60.7	Do.	Cloudy	.019	66.0	65.2	60.4	N. N.W.	Cloudy
16	.977	58.8	59.8	58 0	N.	Ditto	.051	66.0	66.8	62.3	Do.	Cirro-cumuli	.003	73.7	74.0	65.4	N.	Cirro-cumuli
17	.992	60.7	60.5	58.0	N.N. W.	Clear	.059	67.2	67.6	58.3	N.N. W.	Clear	.007	73.0	72.8	60.5	N. N.W.	Clear
18	..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....
19	..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....
20S	.989	55.9	55.3	51.4	N.N. W.	Cirro-strati	.043	65·2	66.2	57.0	N.N. W	Clear	29.993	72 3	71.4	59.7	N. W.	Cirro-cumuli
21	.979	55.8	56.2	54.7	Calm.	Cirro-cumuli	.040	68.0	69.2	60.5	N. E.	Cirro-strati	.972	78.0	77.3	63.8	N. W.	Cloudy
22	30.000	56.3	56.0	53.7	N.N.W.	Clear	.059	63.0	64.0	56.3	NNW.s.	Clear	.995	70.3	69.4	58.0	N. sharp.	Clear
23	29.958	53.6	54.0	50.0	N.N. E.	Ditto	.014	63.4	64.3	56.2	N. sharp.	Cirro-strati	.948	70.0	69.0	57.2	N. N. E.	Ditto
24	.972	51.0	51.2	48.8	Calm.	Cirro-strati	.039	62.0	63.0	54 0	N.N.W.	Ditto	.962	69.8	69.2	55.5	N. sharp.	Cirro-strati
25	.958	50.9	51.6	46 9	N.N.W.	Clear	.006	63.6	64.3	53.7	N. W.	Clear	.938	70.2	69.8	56.4	NNW sp	Clear
26	.873	51.8	51 8	48 9	N. W.	Ditto	29.924	63.9	64 3	54.4	N.W.sp.	Ditto	.859	71.8	71.8	58.0	N.W.sp	Ditto
27S	.902	50.7	51.2	47.2	Calm.	Ditto	.973	65.2	66.0	55.9	W.	Ditto	.915	71.8	71.9	56.3	W.	Ditto
28	.956	51 1	51.2	49 4	Do.	Ditto	30.031	66.2	68 0	57.2	N. E.	Ditto	.979	75.3	74.8	59.2	W.S.W.	Ditto
29	30.010	54.2	54.3	50.3	Do.	Ditto	.079	68.6	70.4	65.0	N.	Ditto	30.022	78.0	77.7	65.2	S. W.	Ditto
30	.036	57.0	56.2	56.4	Do.	Foggy	.091	66.2	67.8	65.7	S. W.	Ditto	.027	78 6	78.2	65.7	S. W.	Ditto
31	.014	59.4	60.0	59.7	Do.	Ditto	.048	71.2	72.1	67.2	Do.	Ditto	29.977	80.7	80.7	69.0	S. W.	Ditto
Mean	29.984	57.5	57.8	55.6	....	....	30.045	67.3	68.1	61.2	....	....	29.989	74.3	73.7	62.7	....	....

[Meteorological Register, continued.]

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. 40. Upper.	Feet. 4. Lower.		
Inches	°	°	°	....	....	Inches	°	°	°	....	....	Inches	°	°	°	....	....	°	°	°	°	Inch.	Inch.		
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	79.8	67.6	55.3	..				1
29.991	79.9	78 8	65.1	N. W.	Clear	29.983	79.8	78.2	65 2	N. W	Clear	29.985	76.2	74.0	65,9	N. W.	Clear	81.2	70.3	59.4	103.2				2
.985	80.2	79 2	67.6	W.	Cirro-strati	.981	80.9	79.2	68,3	WSW	Cirro-strati	.989	77.3	75.4	67.3	Calm	Ditto	81.8	71,2	60.6	101,7				3
.987	79 8	79.2	68.7	N. W.	Ditto	.983	79,5	78,3	68.2	N. W.	Ditto	.983	76.2	75.0	69,0	N. W.	Cirro-strati	81.2	71.6	61.9	100.5				4
.988	80.3	79.3	67.6	N.	Ditto	.987	80 2	79,3	66.9	N.	Ditto	30.004	76.3	75.3	66.8	N.	Ditto	81.9	72.6	63.2	99,0				5
.985	76.1	76.3	66,8	N.	Cirro-cumuli	.977	76.0	75.3	65.1	NNW	Cirro-cumuli	29.988	73.5	72,8	65.7	N.	Scatter'd clouds	77,1	69.2	61,2	90,0			C	6
.961	77 3	76.7	65.7	N. W.	Cirro-strati	.954	76.4	75.4	65.0	NNW	Cirro-strati	.954	73.6	72,8	65.7	N.	Cirro-strati	78.8	69,1	59.3	100,8				7
.893	74.6	73.8	64.0	NNW	Ditto	.882	74,8	73.5	63.5	N. W.	Ditto	.896	71.7	70,2	62.0	N.	Ditto	76.3	69,1	61,9	99.3				8
.834	73,8	73.0	63,1	N.	Cirro-cumuli	.820	75 1	73,8	61.1	NNW	Cirro-cumuli	.824	70 8	69,0	59,4	NNW	Clear	76,0	67.0	58.0	99,8				9
.855	79.3	79.0	65.3	N. W.	Clear	.849	80.1	78 8	65.2	N. W.	Clear	.855	76.7	74.6	65,6	N.	Ditto	81.6	68 4	55,1	104,6				10
.864	83.2	82,8	69.3	N.	Ditto	.859	83 4	82,4	69,8	N.	Ditto	.871	79.4	77.0	70.0	Calm	Ditto	84.6	71,6	58,5	105,6				11
.897	84.2	83.2	70.0	W.	Ditto	.881	84.0	82,7	70.1	w.nw.	Ditto	.894	80.5	78.9	70.3	N. W.	Cirro-cumuli	85,6	74.0	62.3	107.8				12
.954	74 8	73 8	67.0	N.	Cloudy	.935	74 7	74,1	67,0	NNW	Cloudy	.935	72,9	72,4	66,4	NNW	Scatter'd clouds	75.5	70.3	65.0	87.0				13
.931	72 7	71.3	62.2	N. W.	Ditto	.935	71.4	70.2	61.1	N. W.	Scatter'd clouds	.930	69.9	69.3	61,8	N.	Cloudy	73,9	67.5	61,0	90,0				14
.947	66.8	66.3	61.4	NNW	Drizzly	.924	66 4	66.2	61.8	N. W.	Drizzly	.923	66.0	66,2	62.3	NNW	Ditto	67.3	64,2	61,0	..				15
.927	78 5	77.2	66,0	N.	Cirro-cumuli	.918	79,0	77,5	66,1	N. W.	Cirro-cumuli	.922	74,9	73,6	64,8	N. W.	Cirro-cumuli	80,0	69,2	58,4	97,5				16
.944	76.4	76.0	61.9	N.	Clear	.938	76.8	74.8	59.7	NNW	Clear	.950	73.3	71.6	59.6	N.	Clear	77.8	69,3	60.7	96,4				17
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..				18
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..				19
.911	75.8	75.0	60.3	N. W.	Cirro-strati	.908	76.3	74.3	59.4	N. W.	Clear	.921	72.8	70.7	59,7	N. W.	Clear	77.7	66.8	55.8	98.8				20
.936	73.8	73 2	61.6	N. W.	Cloudy	.947	71,9	71.5	61,9	N. W.	Cloudy	.945	70.6	70.0	63.0	N. W.	Cloudy	79.0	67 0	55.0	100.0				21
.914	73 3	72.2	58.3	NWsp	Clear	.918	73 3	71.5	57.4	NWsp	Clear	.920	69 3	67.4	56.7	NWsp	Clear	74.5	65.4	56.2	94.8			D	22
.863	72 9	71 9	58.6	N. W.	Ditto	.856	73 3	72.0	58.5	NNW	Ditto	.867	69.7	67.3	57,2	N. W.	Ditto	74.2	64.0	53.8	94.0				23
.888	72.5	72 0	55.8	NNW	Cirro-strati	.873	72,1	70.4	55.0	NNW	Cirro-strati	.894	68.0	66.3	55,2	NNW	Cirro-strati	73,6	62,5	51.3	93.0				24
.837	72.8	72 3	57.7	NWsp	Clear	.831	72,3	71.0	56.6	NWsp	Clear	.839	68.5	67.0	55.3	NNW	Clear	73.8	62,5	51,2	88,6				25
.792	76.8	76.7	59.3	NNW	Ditto	.778	77.3	75 9	58.0	NNW	Ditto	.782	72 5	69.7	57.9	NNW	Ditto	78.0	65.0	52.0	95.8				26
.855	75.3	74.8	57.9	w.nw.	Ditto	.845	75.8	74.9	57.7	W.	Ditto	.849	71.6	68.2	58.8	Calm	Ditto	77.0	64.1	51.2	97.2				27
.926	78.7	77.7	60.1	w.nw.	Ditto	.916	79,0	77.7	60.0	WSW	Ditto	.926	74.8	71.8	61.0	S. W.	Ditto	80.8	66 3	51.7	103.0				28
.963	81,2	81.3	65.3	W.	Ditto	.954	82,1	80.4	65.7	N. W.	Ditto	.959	77.4	74.8	66.0	Calm	Ditto	83,8	69.3	54.7	105.6			⊙	29
.968	82,3	82.0	67.0	S.	Ditto	.961	82,5	81.2	67.0	S. W.	Ditto	.966	78.0	76.7	66.8	S.	Ditto	83,8	70.0	56,2	102,0				30
.936	84.8	84.2	67.2	S. W.	Ditto	.932	85.0	83.9	66.8	S. W.	Ditto	.941	80.0	77.5	68.0	S.	Ditto	86.2	72.7	59.2	105.0				31
29.919	77.1	76.4	63.6	....	....	29.912	77.1	75.9	63,1	....	....	29 918	73.7	72.0	63.2	....	....	78.7	68 2	57.6	98.6			–	–

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JOURNAL

OF THE

ASIATIC SOCIETY.

No. II.—1850.

Report on the Statistics of Banda.—*By* M. P. Edgeworth, *Esquire, Commissioner of Mooltan, late Collector of Banda.*

The district of Banda forms an irregular triangle bounded on the north and north-east by the river Jumna, which separates it from the Fattehpur and Allahabad districts; on the west principally by the river Ken (Caine), part of the Banda and Pyláni divisions, moreover, extend beyond that river and are bounded by the Hamirpur district, and the Cherkhari and Jaloun states; the south-west and south are bounded by the river Ken and partly by the second range of low hills, forming the flank of the table-land of Bundelkhand. But the intermediate boundary is very irregular, owing to the intermixture of villages belonging to Adjyegarh and Punna among the independent states, but principally arising from the exchange of many villages in Pergannáhs Kúnhas and Bhitri for the Pergannáh of Kálinjar taken from the Chaubehs; this leaves a long slip of independent territory between the Pergannáhs of Budousa and Tiroham. This irregularity of outline is increased by the circumstance that such villages in the above named Pergannáhs, as were then held rent free, were not given to the Chaubehs, but remained under the jurisdiction of the officers of this district.

3rd. The actual area amounts to 18,42,480 acres or 2,174-8 statute and geographical miles distributed as follows.—

Barren, 3,49,214 acres.
Culturable, 4,60,887 do.
Cultivated, 9,63,126 do.

4th. The whole of the district, with the exceptions below mentioned, forms part of the conquered provinces, having been obtained from the Peshwa in 1804, A. D., and brought under the Regulations by Regulation IV. of 1804. Pergannáh Kalinjar was taken from the Chaubehs in 1812, and an equivalent given from Pergannáhs Bhitri, Kunhas and Budausá (vide Regulation XXII. of 1812); Pergannáh Khundeh was added to the district by Regulation II. of 1818, being ceded by Náná Govind Ráo.

5th. The elevations of the trigonometrical stations in or adjoining the district above the sea as determined by the Grand Trigonometrical Survey are as follow.—

Kanakhera,	473.7 feet above sea level.		Kachar,	1519.6 feet above sea level.	
Kartar,	1,179.8 do.	do.	Lalapur,	825.9 do.	do.
Peprendi,	494.9 do.	do.	Pabhasa,	610.5 do.	do.
Seonda,	908.6 do.	do.			

6th. The geological structure of the district is very interesting, and merits a much fuller elucidation than I have the means of giving. There are two distinct characters of country, the plains and the table-land above the first range of hills or *Patha*. The plains are not of the extreme uniformity exhibited in the greater part of the Upper Provinces; they are not only similarly broken by deep ravines, running to the principal rivers, but diversified with isolated hills generally of granite but occasionally of syenite or quartz, either white or tinged of a deep reddish brown by ferruginous matter. The general appearance of the plains is strikingly similar to part of the Siberian steppe as described by Humboldt in his Asie Centrale:—and doubtless the origin of our granitic hills is similar. The granite is exceedingly liable to disintegration into large masses, so as to present to the eye a confused congeries of boulders of all sizes, sometimes in concentric segments of circles, and sometimes in straight parallel lines. The tendency of these masses is to split in fixed directions, not unfrequently so as to leave large surfaces exposed of almost perfect flatness; from this tendency it appears to me that the practice of splitting granite into blocks for building, by the simple agency of fire and water, as used in the south of India, might be advantageously tried here. The granite is much traversed by veins of quartz of every degree of thickness from a line to several yards, and

the nature of the stone is likewise very variable from the finest grain of very great hardness, to a coarse grain so loosely held together by the felspar as to appear rotten and to be quite friable.

7th. The greenstone and syenite are of great variety.

I annex a translation from Jacquemont's travels, regarding the geological features of this part of the country, as shewn in the hill of Kálinjar. I give it as the work is rare *and not translated.* Extract from Jacquemont's travels, Volume 1, Page 427.

Between Nyagawn where M. Jacquemont entered the district and Kálinjar—

"There is nothing to note but some hillocks of hornblende rocks. The slaty structure is entirely unknown,—all are granitic; the suppression of quartz turns it into greenstone which decomposes into concentric balls; its predominance on the other hand gives a straight laminary structure to the rock probably due to the felspar, which is intimately mixed with the quartz, when the latter is very abundant. It is the same as at Adjíghar.

"At length we pass the river Baugi formed by the junction of several streams from the high land, and we enter the great village situated between its right bank and the foot of the hill of Kálinjar.

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"Geological description of the hill of Kálinjar.

"Up to the foot of the escarpement the mountain is formed of syenite rocks which in their varieties and bearing, resemble the appearances (of those) at Adjíghar. The syenite, consisting of rose-coloured felspar, whitish quartz, and black hornblende (in the form of large crystals), is found principally in large unconnected blocks on every stage of the hill; also varieties of the same rock with smaller crystals; others where their flakes (laminæ) of mica are intermixed with the hornblende, without entirely suppressing it. Rocks of felspar and of actinolite or of felspar and of diallage, doubtful with reference to the nature of their component parts here as well as at Adjíghar, and lastly those greenstones which become decomposed into concentric balls; these are the principal kinds. It is equally difficult to say which predominates over the other —which forms the mass of the mountain intersected by the veins of others; but all the passages of one species, or even from one simple variety to another, are cut off; in the extent of the same mass, one

hardly perceives from one extremity to another the smallest modification arise, be it in the proportion of the mineralogical elements or in the size of the crystals. One would say, that the whole mountain is formed of a great number of immense polyhedric masses morticed one to another, some species more, others less frequently, recurring.

"I have not seen Basanite (Brongniart, Classification of Rocks) in the place nor spread on the declivity of the mountain, but several mutilated idols are sculptured of this rock, and I have good reason to believe that they did not go far to seek it." (This is the greenstone teliya alluded to by me in para. 9.) "The thickness of the sandstones which cover up this system, seems to me the same as, or slightly greater than at Adjíghar. These sandstones are identical in their composition, in their appearance, and the peculiarities of their bearing with those of Adjíghar. They form like them immense compact masses, which divide, only according to lines almost straight or horizontal, into so small steatite or clayey beds that they are easily missed in the sections of the ground. With these compact shelves are intercalated beds with a cleavage parallel or oblique to their lie. These differences in the mode of the interior division of each bed are isolated from all the others. Towards the middle part and the summit, the predominating variety has a very fine grain (exclusively?) quartz. Its colour is of a greenish grey, its hardness extreme. One may call it granular quartz. Lower, with the same structure and the same hardness it becomes reddish and very sensibly micaceous. It is sprinkled with tolerably large reddish spots of a deeper colour, which lose themselves in the interior of the rock, and seem formed by slight accumulations of red clay, and spotted with little round stains, brown or ocherous, produced by cavities sometimes lined, more commonly filled, with concretions of oxide of iron. Open and exposed to the air, these cavities soon empty themselves of the substance they contain, and thus give to all the old surface the appearance of being pierced with holes. The first variety of a dirty greenish yellow destitute of mica reappears above this, and covers again a bank of a hardness, of an equal fineness, and of a brown colour, in which are dispersed some grains of a shining glassy quartz, and round fragments of ochery clay. (Perhaps the round cavities are filled with this substance?) In this sandstone there extends in lines slightly marked a conglomerate,—in which are embedded, in a ferruginous and micaceous or flinty cement,

fragments (evidently) of compact clay and white quartz, which seem to become blended with the flinty and crystalline cover which envelopes them. A greenish clay, in small and curved heaps, lines the largest heterogeneous parts of this breccia, and its flinty and crystalline matrix is full of cavities, as in the sandstone, filled, or oftener lined, with an ochery substance. This conglomerate resembles much certain varieties of the diamond-bearing conglomerate of Punna. It forms a sinuous unequal bed, of which the thickness does not vary less than ¾ to 1½ foot in the slight extent which I could examine. It is immediately covered with small layers of sandstone which are separated by clay. Underneath, I have only seen the sandstone described in the last place with fragments of baked clay and shining grains of glassy quartz; but their actual observation was impossible, and I could only make conjectures on what I should have found, descending to meet the syenitic rocks. In a deep excavation open towards the mean height of the escarpement, and which descends within its walls even below its base, I observed the beds the lower part of which I will now describe. A circumstance worthy of remark: this excavation leads to a subterranean well, of which the depth, they say, is unknown (Pátál Gangá). The bed of the conglomerate there reaches the level of the water; the sandstone with grains of shining glassy quartz is submerged. These grains of shining glassy quartz are exactly the same as those found at Adjíghar, in the porphyry and sandstone which border on it. Here I have not seen porphyry well defined; but is it not represented by the conglomerate? It is in the porphyry at Adjíghar as here in the conglomerate that a similar cavern full of water opens; perhaps, elsewhere the porphyry exists under the conglomerate; a rock half decomposed, of a doubtful structure, which is found at some distance from thence, underneath the syenite, completes the resemblance of the two localities. It is formed of a green and red matter (perhaps of clay or of Actinyte and feldspar decomposed), in which are embedded some crystals of red feldspar and fragments of white quartz. The red matter forms here and there little leaf-like masses. Is it a crystalized rock in a state of decomposition? Is it a sandy rock? I cannot say; but it is the same rock which I have seen at Adjíghar, enter into the syenites and the porphyres. It constitutes here in like manner a thick mass, moulded on in relief on the syenite, which divides itself

obscurely in great pseudo-regular rhomboids. The summit of the mountain is covered with the same red gravel (oxide of iron), which is found at Adjíghar, on a multitude of places on the Plateau of Rewah, and which is washed at Punna as a diamond mine. Kunkur is entirely wanting, the gravel has been often washed by the people of the garrison, and diamonds have never been found, but as they are occasionally found on the neighbouring mountains on the confines of the Plateau, the seekers are not discouraged; they are also found in the plains at the foot of these mountains."

8th. All the more scattered and outlying hills are of granite (rarely of quartz), as we advance southward more or less of the greenstone syenite appear, and finally we find the hills capped with a perpendicular escarpe of sandstone of more or less depth. The lower strata of the sandstone appear to me to be more or less altered by heat, where meeting the granite, the metamorphic strata being sometimes only a few inches, as at Kálinjar; but in other places a thick mass of metamorphic rock is interposed, consisting either of very hard silicious masses, (sometimes of very great beauty when polished) or of a very hard stone termed by the natives Kurbia (hornstone); this forms the base of all the outer hills from the Pysuni to the Ohun. It is noticeable from its tendency to break into irregular, somewhat cubical masses, seamed on the upper surface with deep scars. This tendency often gives the base of a hill, the appearance of having been cut into giant stairs. The stone is used only for building and in the rough, as it is too hard to be dressed. In this rock are the very remarkable caves called the Gupta Godávari, near Chobepur, in Pergannáh Bhitri; and although not at present included in the district, being in the lands given to the Kálinjar Chaubehs, I may be permitted to notice so very remarkable a curiosity, as being within the former limits of the district. Where they occur the hornstone must be upwards of 150 feet thick: there are two caves one below the other. In the lower one, progress is soon stopped by the depth of the water, which is by the superstitious Hindus believed to come direct from the Godávari; the upper cave consists of 3 irregular chambers: the walls are perfectly dry, no stalactites or any of the usual appearances of caves. The principal hall is of very considerable height, and the summit of the dome-shaped roof appears to have broken in, and the fissure to be filled by a mass, which

appeared to be sandstone. In the inner cave is a stream of water, the temperature of which was 84°, (that of the free air being 55°,) which may be considered as the mean temperature.

9th. The great mass of the hills forming the barrier of the tableland consists of sandstone. This lies in layers of very different degrees of thickness and hardness; some being quite friable, others admirably adapted for building, millstones, and many other useful purposes. Most of the highly ornamented temples in the district are built of this stone, which has preserved a wonderful degree of sharpness in the carvings, after centuries of exposure to the weather. The principal quarries are as follows:—Rawli, Gondá, Sidhpur, Mudyan Panwári, Bhowuri, Kolgudhyá, Buryári, Kulan, Pardawan and Benipur Páli. But small quarries are opened at many other places for local purposes, especially millstone making. A quarry of greenstone termed teliya, is situated at Purwa in Pergannáh Kunhas, (now transferred to the Chaubehs in lieu of Kálinjar); it admits of a very high polish and is much used in making idols, &c., although a similar stone is found in some of our own villages, it is not quarried elsewhere. A green coloured sandstone is found near Rusin, which is used for colouring walls; the stone is ground, mixed with gum water and grease, and smeared upon the walls; it gives a dark bluish green colour. It is found, but in smaller deposits, near Tirohan, especially at the summit of the remarkable hill of Sudhwárá and below the surface, in the bed of a nullah at Bramh Kund near Kámtá. It appears to be crude greenstone, not hardened by igneous action into the usual form of that rock.

10th. A stalagmitic deposit of limestone overlying sandstone occurs near Gurhrámpur, which is extensively quarried and burnt at the village of Gurhrámpur, whence it is extensively exported; it is valued from its great whiteness and purity. This deposit occurs abundantly elsewhere, and I have found it in every one of the similar dells I have examined in the Kalyángarh Pergannáh; but it is not used there as that Pergannáh is not so accessible as Gurhrámpur.

11th. The appearance of the sandstone crowned hills running along with a horizontal crest scarped summit and steep glacis with occasional heights and promontories, cannot fail to remind the spectator of a sea-coast view, while the solitary hills below have every appearance of islands standing in the now dried sea at their base.

12*th*. Ascending to the table-land or Patha, we find a very shallow soil resting on sandstone often cropping out in rugged rocks the harder portions standing up in relief, when the softer have been worn away. The unequal hardness of the layers composing the mass of sandstone, has given rise to some very curious and beautiful chasms formed by the streams. That near Gurhrámpur, where the limestone abovementioned is found, is not a mile outside the boundary, and of very remarkable appearance, the rocks above actually overhanging the base of the chasm, which must be upwards of 200 feet deep, and which after heavy rain must be a very fine waterfall. Similar, but larger falls are found on the Baghin, in the independent states 16 to 20 miles south of this district. Similar falls occur at Bedhak above Nihee, and Abarkan and Dharkhund above Kalyánpur, Pergannáh Kalyángarh, of smaller extent than the Gurhrámpur ones but of singular beauty. The falls of the Burdaha are broad but not very deep, there is a long cave or covered gallery running under the fall; it is situated on the confines of Mauzás Auchadi and Mow, Pergannáh Kalyángarh. Those of the Pysuni are double and the rock does not overhang: as in the other instance, they lie a few yards from the high road, near Mauza Bombhuá, Pergannáh Kalyángarh.

13*th*. In Pergannáh Kalyángarh iron is found and is worked pretty extensively at several points especially at Gobarhái; it is considered of very fine quality. The mines are situated high up in the hills. The works at Gobarhái are managed by a company of Lohars (blacksmiths); they pay nothing to the Zemindars for the right of digging the raw ore, but a sum of Rs. 4 per kiln per season. Work commences as soon after the close of the rains as they can get a sufficient quantity of charcoal ready, but it is not in full vigour till March. The manner of smelting is as follows. The ore, termed *Dháú* is broken into small pieces, and put into the first furnace, termed *Nár*, which is merely a sort of oven sunk below the surface, mixed with common charcoal, made indiscriminately from any wood; it is kept in a high state of ignition with a rude pair of bellows (Jór). A buffaloe load of charcoal is expended in one day upon about 1 or $1\frac{1}{4}$ mun of the Dháu, and after the whole day's work the first process is considered complete. The large mass of iron termed Chuli is then drawn out with a long pair of tongs termed Kargúhá or Sansi; it is cut in two while hot

with a great axe (Kulhári). These pigs are subsequently put into the refining furnace or Murai, which is more artificially built with a long chimney slanting upward, and with but one opening below. The furnace is filled up with charcoal, and in this stage that prepared from the Bambu is exclusively used, the orifice is nearly closed below and after the charcoal has all burned out the purified iron is removed, and in this state, termed Ogári, is sold. The slag left after the first process is not very heavy, and is porous; but that after the second operation is very dense and heavy: both are indifferently termed *Khit*. Five coolies are employed at each furnace (*Nár*), one at the bellows, and four at putting on fuel, and they each receive 2 annas a day. The digging of the ore and the greater part of the labour is performed by Koles, who receive wages of a rupee for 8 days, the more skilled part of the work is performed by the Lohárs themselves. The mines are situated at the top of the hill near the village of Gobarháï, about 1½ mile from the smelting works, and 300 feet above them. The mass of the hill consists of sandstone, but the top is ferruginous; deep shafts are sunk and extensive passages are burrowed through the hill, as the ore lies at a distance of many feet from the surface. The mines were not at work when I visited them in January, consequently I was not able to enter them. The mines at Deori are, I am informed, worked in a similar manner. Those at Khiráni, in zillah Ucheyrá, adjoining this district, are managed by the Zemindars who pay the Lohárs only 1 R. per 10 days.

14*th*. Pipe clay is found in a pretty extensive deposit on the hill above Kolagudyá, Pergannáh Tirohan. It is found below the hornstone stratum mentioned in para. 8. Deep shafts sunk into the side of the hill through that rock, meet with a mass of hard white flint, and a soft greenish stone mixed with a profusion of agates in every stage of crystallization; and the pipe clay seems to be the softened state of these last stones. It was at one time used by Dr. Jeffries in his factory at Fattehgarh for pottery.

15*th*. The soils of the low ground consist of several varieties, but the principal ones are the *Mar* and *Kabur*, two varieties of the black soil termed Regur in the Peninsula. Specimens of these soils were sent for analysis to Mr. Middleton, at the Agra College, but want of means has prevented his being able to favour me with result to show

how far they differ from the Peninsular black soil. The main difference in description is that this soil here is not so easily pulverized as is there described. It is very retentive of moisture which is the main cause of its exceeding fertility; the gradual drying of the ground produces cracks and fissures, which continue deepening during the continuance of the dry weather; I have found however the soil quite moist at 4 feet below the surface in the month of June, after seven months unbroken drought.

16*th*. The following are the local native names of the different varieties of soils,—*Mar* or *Marwá*, is the blackest, of a very close grain and exceeding hardness, and when dry of a shining conchoidal fracture; this is generally situated in extensive patches rather lower in level than the rest of the country, and consequently crops in it are liable to injury from overrain. I am inclined to attribute the deepness of its color and richness to the admixture of decomposed vegetable matter.

17*th*. *Kabur* is in many respects similar to the *Mar*, it is of a lighter color, is more mixed with sandy particles, is not quite so productive as the former in its best seasons, but more uniformly to be depended upon.

18*th*. *Gond* (or *Khera*) is the name given to the land immediately adjoining villages, these are generally highly manured and occasionally even irrigated and cultivated with tobacco or vegetables.

19*th*. *Dandi* is more gravelly than *Segon* and less so than *Kankur*, generally on highest ground whence its name, and most cultivated in the rainy season.

20*th*. *Purwa* is similar in all essential parts, but less fertile, of a reddish color, and as far as I can ascertain, the best of the three for cotton; it is also termed *Segon*.

21*st*. *Kankur* is very extensive in the southern parts of the district, and is the worst soil, containing a great deal of sand.

22*nd*. *Barwá* is a sandy loam, but of very partial distribution. *Tari* and *Kachar* are sandy loams of very rich quality lying low by the side of streams, the former is sometimes, the latter annually, submerged by floods in the rains. These floods often leave an exceedingly rich deposit termed *Now lewa*, which gives the finest crops of wheat; but the extent of this soil varies every year and often alternates with barren sand. When the water subsides in the Jumna, and as soon as

the alluvium becomes solid enough to bear the weight of a plough, experimental furrows are made to ascertain if the deposit be deep enough to be available for cultivation ; it is so considered, if it be a foot deep. When thoroughly dried the Now lewa separates into cakes of great tenacity, like tiles or bricks according to its depth ; in places where the alluvium does not bear the weight of a man in November,—not only on the Jumna but along the Ken, Baghin and Pysunee,—cultivators, especially the Khewuts (or boatmen), sow a crop of barley or wheat, scattering the seed as far as they can, above the surface of the quicksand ; by the time the corn is ripe, the deposit assumes a sufficient degree of solidity to allow of the reapers going on it.

23*rd*. *Usar* is a peculiar soil very dark in color, found only in low situations ;—it will not produce any crop but rice, and that only in seasons of extraordinary wet.

24*th*. The soils peculiar to the Patha are *Setwuri*,—a greenish sandy loam, and *Gorowte*, a light soil easily pulverized (I suspect highly aluminous).

25*th*. The general aspect of the country is extremely rich, the low country being generally well cultivated and well wooded, not only with groves of mangoes and mowhas, but with noble trees of the latter species standing in the fields ; hedges or enclosures are rare, except such fences of dry thorns in the neighbourhood of jungles and just round the village itself. Where deer are very numerous I have observed a fence made of a single string with bits of straw or feathers tied in it struck on poles. Some parts have been denuded of trees either during the troubles preceding our acquiring possession of the country, as in the immediate neighbourhood of Banda, or subsequently owing to the demand for timber and the impolitic over-exaction of revenue, to meet which timber was felled to a lamentable extent. In the southern and eastern portion of the district, the scenery in the low land is of great beauty, consisting of rich cultivated plains dotted with noble trees, and broken by rugged hills, and occasionally by large tanks or clear streams. The top of the table-land, diversified with hills, forest and rocky streams, is less rich but by no means devoid of beauty.

Climate, 26*th*.—The climate of the low land of Banda differs in some important respects from that of the Doab. The cold is less intense in the cold season, frost being rare except in the moist land

adjoining the rivers. The injury done to crops and attributed to frost by the natives, I am inclined to lay to the account of electric phænomena, because it always occurs in irregular patches in the field, without any patent cause or reason from lowness of situation, dampness or exposure as would be the case were frost the cause. It likewise occurs when frost is impossible from the general temperature of the air. The hot weather commences in the middle of March and the spring crops, wheat, &c. are consequently ready for the sickle early in that month and very little is left uncut by the beginning of April. The hot winds are distinguished by two peculiarities; first, the absence or extreme rareness of dust storms; secondly, the exceeding purity and transparency of the atmosphere during greater part of that season especially in the afternoons, when in other parts of India, the sky has a hazy appearance from quantities of dust and fog in the air. I attribute this peculiarity to the constant exhalation of moisture proceeding from the ever-deepening fissures of the black soil. To this purity of atmosphere may perhaps be attributed the frequently fatal effects of the hot winds, or rather in my opinion, of the sun; deaths being not unfrequent among the natives from exposure at mid-day. In the commencement of the hot weather when the nights are still cold and the sun is powerful from the moment of its appearance, the optical phænomenon of the elevation of distant scenery is not uncommon, either so as to elongate the groves and trees naturally visible or so as to bring objects far beyond the natural field of view into sight. I have not been able to keep a very regular register of the thermometer owing to my absence in the interior of the district. The following is an abstract.

	1847-48. Means.				Extremes		1848-49. Means.				Extremes	
	Minimum.	Therm. at 9 A. M.	Maximum.	Mean.	Depression of wet bulb at 9 A. M.	Min.	Max.	Minimum.	Therm. at 9 A. M.	Maximum	Mean.	Depression of wet bulb.	Min.	Max.
May, ...	88,9	97.5	105.5	97.2	16	83	112	83	97.8	109	96.0	18	78	114
June, ...	88	97.1	108.1	98	12.5	78	112	84.8	95.8	104 6	94.7	12.2	79	110
July, ...	78.6	89.3	95	86.8	4.9	70	105	83.2	89	98	90.6	7	76	108
August, ..	78.4	85	90 2	84.2	2.9	74	100	79	86.6	93	86.2	4	76	99
September,	77.2	87	92.6	84.9	4.1	74	99	76.7	86.1	92.3	84 5	6 3	73	100
October,..	69.5	79.9	86.6	78	5.3	64	91	72.8	83	93.2	83	9.1	67	98
November,	59.5	67	75.5	67.5	3	56	78	57.7	71	82.6	75	0.6	49	87
December,	53 4	62	73.5	63.4	4	49	78	48.2	64.6	79	63.6	..	41	85
January,..	52.7	62	74	63.4	4	47	79	45.4	57	73.2	59.3	..	35	82
February,	52,2	59	71 6	61.9	5	45	80	52.8	64	85	77.9	..	44	96
March, ..	69.1	82.8	96	82.5	12.5	61	104	69						
April, ...	82.2	96	105.3	94	16.5	75	110							

The observations at 9 A. M. were not made every day. The very remarkable difference in the means of the two years is very striking, and renders it desirable to have observations extending through a much longer period. The instruments used were self-registering thermometers by Newman, the same which I employed in observations made at Amballa and published in J. A. S. 1839. They were hung in a northern Veranda about 7 feet above the ground. The temperature, as deduced by me, is very different from that given by Mr. Sutherland, because his register was kept inside the Jail Hospital, and therefore shews much less variation of temperature. The annual mean of my observations from May 1847 to June 1848 is 88° 4′, and from March 1848 to February 1849 is 88° 8′, which is considerably higher than the mean of Fattehgarh.

27*th*. As soon as the fall of the first rain in June softens the ground, then as hard as stone and full of deep fissures, the ploughs are brought out and all the land ploughed that is possible, that lying lowest is generally reserved for rabbi sowing, but not unfrequently if the rains begin badly, it is sown with kharif which succeeds or not according to the amount of rain; if it be, as is most general, destroyed by wet, it is ploughed in and rabbi sown in its place in November, but when the rains fail and the crops are very bad generally, these low grounds which are the most retentive of moisture yield fine crops, as was the case in 1848. The rabbi ploughing and sowing commences in October and continues till December, if the ground remains moist, but when no rain falls late in October or in November the ground becomes so hard as to render ploughing impossible, and seed if sown will not germinate as was the case to a lamentable extent in 1848. No regular rotation of crops is followed, but the almost universal mixture of crops answers the same purpose agriculturally.

28*th*. In the Patha, only the lands adjoining villages, or similarly favoured spots are capable of continued cultivation; other lands are seldom cropped for more than 3 years consecutively, and then left fallow for an indefinite time.

29*th*. The plough used in this district is the simplest, the common Indian plough. The large Búndelá plough or Bákhar is not generally used in it, except in the western part of Pergannáh Khundeh. The ground is very seldom harrowed or rolled, the earth being left in clods.

The carts used for bringing home crops from distant fields are termed Sudaha and are of the very rudest description, but very light and able to go over very rough ground without injury.

Production. 30th.—I divide the productions of the district under the heads of the two seasons—1st, the kharif or autumn crops which are sown in June and August; 2nd, the rabbi or spring harvest the sowing for which takes place in November and December.

31st. The main kharif crop in value is cotton. This is sown as soon as the rains commence in June or July, if the rains are late, a less breadth is sown, as a fine crop cannot be expected. It is generally mixed with some other plant, such as the Hibiscus cannabinus, Joar, Indian corn very thinly scattered and cut down before the cotton has attained its full growth, or Arhar (Cajanus bicolor), which succeeds the cotton in the end of the cold weather. The cotton begins to ripen in October, and is collected till January when the plant withers away.

32nd. Joar (Sorghun) is the most extensive crop as well as the cotton, it is very carefully weeded in the earlier part of the season, and a plough is lightly run through it to loosen the soil about the roots, the plant grows to a great height,—whole fields from 12 to 15 feet high,—the stalks are good fodder for cattle; they are chopped small and sold in the Bazar under the name of Kutya. The heads are cut off and brought to the thrashing floor when ripe, which is seldom till the end of November or beginning of December.

33rd. Bajra (Pennicillaria spicata) is likewise very extensively cultivated in all repects similarly to Joar. They are not ripe till the latter end of October or November, nor are the stalks all cut till February. In Pergannáh Chibu, the stalks are used for thatching, a purpose to which I have not seen it applied elsewhere.

34th. Sun (Crotolaria juncea: country hemp) is a frequent crop. The practice of leaving it to wither and ripen its seeds before cutting is a universal system and most injurious to the strength of the fibre produced. It is cut in January, and soaked in the rivers and ponds for some days, the outer bark is then taken off and the inner fibres pulled off by hand, the residue termed Silowa is used for basket making, and coarse mats to protect mud walls from the rain, &c. &c.

35th. Sun (Hibiscus cannabinus) is grown along the edges of fields, and mixed with cotton or Arhar, and is treated in a similar manner to the Crotolaria.

36*th*. Múng, Mash or Urd is cultivated pretty extensively, but generally mixed with Bájrá or Joar or Til. I do not recollect to have seen a field of it by itself; it ripens in October.

37*th*. Moth (Phaseolus aconitifolius) is similarly cultivated but not so often.

38*th*. Arhar (Cajanus bicolor) is very extensively sown both by itself or mixed with cotton in June, July, and the produce is sometimes, (as this year) very great; it is reaped along with the wheat in March, it grows to the height of 10 and 11 feet sometimes. The twigs termed Kháru are of great use in basket making.

39*th*. The smaller millets, Chini (Panicum meliacium) and Kangni, here termed Kákún (Setaria Italica), are sown with the first fall of rain and are generally ripe and cut in the course of August, or early in September. A variety of the Panicum meliacium termed Kútki is peculiar to the Patha.

40*th*. Til (Sesamum orientale) is extensively cultivated both by itself or mixed with cotton or Urd. There are mills in most villages for expressing the oil; it is reaped in October.

41*st*. Sugar-cane is not now cultivated as a crop for sugar except in a few villages in Pergannáh Kálinjar, but only as a luxury in gardens; formerly it was more cultivated and numerous stone Kolus are to be seen lying about villages; but I am informed that these were really never used but distributed by a benevolent Mahomedan Governor in the time of Aurangzeb, for the purpose of encouraging the cultivation of the Cane; the general objections to it are the want of water for irrigation and the extreme abundance of white ants. It would, I think, be well worth while to attempt the introduction of some of those varieties which are stated to resist the attacks of those insects.

42*nd*. Rice is cultivated but partially, and only in such parts of the Mar land, as are lowest and almost continually under water. I have little doubt but that this crop might be very advantageously extended were there any means of securing a supply of water. A small quantity is sown in the rabbi along the edges of the rivers by the Khewats and reaped in March; a mode of cultivating it new to me.

43*rd*. Kodon (Paspalum scorbiculatum) is cultivated extensively. It is especially near the hills in Pergannáhs Budausá, Tirohan and Chibu.

44*th*. Mandua called here Murai (Eluesine corocana) is cultivated near and in the hills.

45*th*. I have not observed either the Sawank (Panicum frumentaceum), or Kutti (Dolichos uniflorus), cultivated in this district. But the wild Sawank (Panicum colonum) entirely covers the fallow Mar ground (reserved for wheat when there has been enough rain; in dry seasons as 1848, there is none), and in September or October crowds of the poorer classes may be seen sweeping the surface of the grass with a sort of basket to collect the small grain which easily falls out. In tanks where wild rice grows the grain is collected in a similar manner.

Rabbi crops. 46*th*. The principal crops are wheat, gram (Cicer arietinum), and channa or *Rubela*, which are sown both alone and mixed from the middle of October to December, according to the termination of rains. They are always sown in drill. The crops are very fine in the Mar and Kabur lands but liable to injury from heavy rains flooding them in the early part of the season and still more from rust, the almost certain consequence of rain in February.

47*th*. Barley is also considerably sown, generally mixed with gram especially in the Southern Pergannáhs.

48*th*. Masúr, *Ervum lens*, is also rare and principally in the above named Pergannáhs.

49*th*. The oil seeds Sarsún, Rái, are very partially cultivated, mostly in the Kachar land, and sown in lines among wheat. Lahi (Eruca sativa) is similarly cultivated especially in the Pergannáhs near the hills and in Segon and Kabur.

50*th*. Tobacco is sparingly cultivated in the fields adjoining villages capable of little irrigation; it is of a very coarse quality. A small quantity of vegetables are grown in similar situations. The Brinjal, here called (Bhanta), is also grown on the sides of ravines and Nullahs. Melons, Kakri (Cucumis utilissimus), and water-melons are grown in the sands of the Ken and Jumna, sown in January and February, and yielding fruit from March till the rise of the river washes them away.

51*st*. The castor oil plant, *Ricinus vulgaris*, is extensively grown in the Tárri lands along all the rivers, and the oil is expressed and sold at 10 seers per rupee, and under its shade I have occasionally observed Turmeric grown.

52*nd*. In one estate Manpur-baryé, Pergannáh Seondá, there are extensive Pán gardens, the irrigation is derived from some ravines dammed up, which form a large pond of most irregular shape. It is sheltered on the north by a lofty hill.

53*rd*. In addition to these regular crops the Mowha tree must not be omitted. This most valuable tree *(Bassia latifolia)* is both cultivated extensively in the low lands, and grows wild in the hilly tracts of this district. In March and April, after the leaves fall it produces an abundance of fleshy, sweet-tasted, nauseous-smelling, top-shaped, pale yellow flowers at the end of the branches; these falling during the night, early in the morning the women and children go out with baskets to collect them, picking them off the ground from which the dry leaves are previously swept: the leaves are used to put under heaps of grain in the granaries and khatas.

54*th*. In June and July, the fruit ripens, the flesh is eaten, and the kernel yields abundance of very valuable oil, which is used both as food and for burning. It is frequently used to adulterate ghee. The timber is likewise excellent.

55*th*. The hills to the south of the district afford a variety of timber, but this comes principally from the independent states. Among the more useful timbers I may enumerate Bambus, Tendoo *(Diospyros melanoxylon)*, the heart wood of which is ebony, Kem *(Nauclea)*, Haldú *(Nauclea cordifolia)*, Khawá *(Pentaptera Urjuna)* producing a dark-coloured wood, Akol *(Allangium hexapetalum)* the hard wood of which is very beautiful, and Gantha *(Schrebera suritenoides)* a very hard tough timber.

56*th*. The teak is found both in the hills and plains; a considerable wood of it, in the lands of Khundeh Khas, is now growing up and merits attention. It was entirely cut down some years ago, and young trees are springing up from the roots; but no particular care is taken of them.

57*th*. Among scarped and overhanging sandstone rocks great abundance of honey is found, which is taken by a low caste named Khaticks, who build up a frail scaffolding of bambus among frightful precipices and after smoking the bees carry off the comb.

58*th*. The Chironji *(Buchanania latifolia)*, is very abundant on the hills and the fruit is exposed for sale in great quantities in every bazar,

the kernel of the stone is about the size of that of a cherry having very much the flavor of the Pistachio. The fresh fruit is sub-acid and said to be very delicious when quite fresh. I have never had an opportunity of tasting it.

59*th*. Jámon, Jamoá, and a third species of *Eugenia* found by the banks of rivers, yield small acrid fruits which are much eaten by natives.

60*th*. The Jhár-beir *(Zyzyphus nummularia vel Jujuba)* is found in every direction, the fruit is gathered and exposed for sale in the bazars. The whole bush is cut with hooks, threshed, so as to separate the leaves which are an excellent fodder for cattle and especially for sheep, and the thorny branches remaining are either used to make fences or as fuel.

61*st*. The Babul *(Acacia Arabica)*, is most abundant in the northern part of the district springing up every where spontaneously, yielding a gum, good fodder for goats, thorny branches for fences, and excellent timber for agricultural purposes.

62*nd*. There are not many gardens in the district, the depth and brackishness of the water generally being against that, however with care, plantains, oranges, limes, and shaddocks of very fine quality are produced. The Khirni and Jack fruit are rare. Phalsás and cultivated Bers are abundant. Mangoes of very inferior quality are abundant, but all attempts to introduce good varieties have failed ; the trees are said to degenerate.

63*rd*. A peculiarity in Bundlecund is the custom of preserving meadows (Rukhel) for hay, this is of the best quality principally from a sweet-scented species of Anthistiria called *Músel;* this springs up during the rain being ready for cutting in October, when it is cut and stored. The usual price in the Banda market is 1,000 bundles for the Rupee, each bundle being as much as can be contained by both spans of the hands.

64*th*. The very destructive weed Kans *(Saccharum spontaneum)*, yields a good coarse grass for thatching. This weed has long spreading roots which strike deep into the earth, and when it has effected a lodgement it is most difficult of extirpation and almost entirely prevents any attempts at cultivation. It is said however to die out after from 5 to 8 years if left to itself. I have been endeavouring to destroy it by flooding, but my experiments failed owing to the badness of the last rainy season.

65*th*. Pyal, the soft straw of the Kodon and wild Sawank, is much used for horses' bedding.

66*th*. These are the principal articles either cultivated or collected from the jungle.

67*th*. There is another which might be made to yield a most valuable product. The Wrightea tinctoria, Dúdhi of the people here, Indarjow of other parts of India, grows in abundance on the most barren granite rocks, and yields a very large quantity of Indigo; but unfortunately its uses are unknown, and I have been unable to persuade any one here to undertake the manufacture.

68*th*. I annex a list of the plants I have found in the district, Appendix II.

69*th*. The wild animals are pretty numerous, antelopes and ravine deer* are very abundant throughout the district. Nilgáyis called Roz, are not uncommon. The Sambur (or Elk) of southern India abounds in the hills to the south of the district, and is very destructive to the crops adjoining the jungles, as are the wild hogs. Spotted deer are rare; hog-deer unknown; hares abundant. Of ferocious animals, the tiger is not rare among the hills, sometimes extending his depredations into the plains. One was killed in 1848, in the open country twenty miles from the nearest jungle. Leopards are not uncommon in the rocky hills, hyenas numerous, and wolves terribly abundant and destructive. During 1848, 73 lives were reported in the Police offices as destroyed by wolves. Consequently rewards of five Rupees for a full grown and one Rupee for cub wolves have been sanctioned, and a considerable number are brought in by the Kanjars.

70*th*. Porcupines, ichneumons and rats are common, but the latter do not seem to commit any depredation in the fields as they do in the north-west. Snakes and scorpions are exceedingly numerous. No fewer than 106 deaths from the bite of the former were reported during 1848.

(*To be continued.*)

* The 'Goat Antelope' of some, or *Gazella cora*, H. Smith.—Ed.

Notice of a copy of the fourth volume of the original text of Tabary; by A. SPRENGER, *Esq.* M. D. *Communicated by Sir* HENRY ELLIOT, K. C. B.

One of the most important books which it was my good luck to find during my late missions to Lucknow, is the fourth volume of the history of Tabary (who died in A. H. 310), of which I believe no other copy is known to exist. In the collection of Colonel Taylor is the 3rd volume, and in the public library at Berlin are the 5th, (which has been printed) 10th, 11th and 12th volumes.

It is a volume in small 4to. of 451 pages, 15 lines in a page. Out of these 10 pages or five leaves are wanting: the first two leaves, and three from the body of the work: the writing is ancient and bold, and though not without errors generally very correct. I should say from the appearance the copy is five hundred years old.

The subject of this volume is already known from Professor Kosegarten's preface to his edition of the fifth volume. It contains the life of Mohammad. It ends however with the battle of the Ditch, yet the volume is not defective at the end.

The intrinsic merits of the work are not so great as might be expected. Two-thirds of the book consist of extracts from Ibn Isháq and Wáqidy, and only one-third or thereabouts contains original traditions. Some of these are very valuable, inasmuch as they contain information not to be found any where else. One of the most interesting documents of this description are extracts of letters from 'Orwah to the Khalif 'Abd al Malik b. Marwán. It would appear that the Khalif had entertained doubts on several points in the life of the prophet, and as 'Orwah was the most learned man of his age, he wrote to him to have them cleared up. 'Orwah b. al Zobayr was born in A. H. 22, and he collected traditions respecting the prophet from his father and mother who was a daughter of the first Khalif, and from 'Áyishah, a widow of Mohammad, and from other persons who had stood in intimate relation with the prophet, and owing to his extraordinary attainments in the science of the traditions and in law he was called one of the seven divines of Madynah. One of the pupils of 'Orwah was Zohry. He lived mostly at the court of 'Abd al Malik b. Marwán and of his son Hishám. Yazyd b. 'Abd al Malik

appointed him as Qádhy and he died in A. H. 124. The greater number of traditions respecting the life of Mohammad collected in the works of Ibn Isháq, a pupil of Zohry, who died in A. H. 151, as well as those collected by Abú Isháq, who died in A. H. 188, by Wáqidy who was born in A. H. 130, and died in 207, by Bokhá-ry, by Moslim and Tabary, &c., had been handed down by Zohry, and there is every reason to believe that he preserved the accounts which he had received regarding Mohammad, not only by teaching them to his pupils but by committing them to writing.

Tabary in conformity with the pedantic habit of his time, traces every tradition to an eye witness; the names of the authors from whose books he makes extracts (which are, wherever I have verified them literal) occur in the string of his isnád, but no mention is made of their writings. So that the reader who is not acquainted with the literary history of that period, is led to suppose that the traditions which his book contains had been handed down to him orally and that he was the first who wrote them down. I give an example of his isnáds: "I have been informed by Ibn Homayd that he has been informed by Salamah, who said that he had been informed by Mohammad *Ibn Isháq*, who said I have been informed by Mohammad b. Moslim *Zohry*, and by 'Ásim b. Omar b. Qatádah and by 'Abd Allah b. Aby Bazr and by Yazyd b. Rúmán who all had it from 'Orwah and other learned men, and they had it from 'Abd Allah b. 'Abbás (who was an eye witness of the story related)." The story which follows after this isnád, is literally copied from the book of Mohammad Ibn Isháq, yet who could guess from the quotation of authorities that Tabary gives an extract from a book? In the same manner he quotes Wáqidy and other authors.

I will now examine the contents of this volume.

Page 1 to p. 58 an account of the ancestors of Mohammad. It is chiefly derived from Ibn Isháq, but the subject was treated at greater length and with more accuracy by Wáqidy. The genealogy of Mohammad must be divided into three parts. The first, that is to say, the genealogy from Abraham to 'Adnán is mythological. Mohammad maintained that he was descended from Ishmael, (though it is more likely that he was a Jocktanite,) and his followers to give more credit to his assertion made up of Jewish names a genealogy from 'Adnán to Abraham. In the

second part the relation of the Qorayshites, the tribe of Mohammad, to other tribes is symbolically expressed. Most of the genealogies of Arabic tribes must be viewed as ethnographical symbols, expressive of the mutual relation of the tribes. They apply these ethnographic symbols also to other nations. Thus in speaking of the Spaniards they would say that they are children of Rúm (the Romans) who was a brother of Yúnán (the Greeks) and Rúm and Yúnán were sons of Açfar the father of all northern nations, &c. Only the genealogy from Qoçayy to Mohammad can be regarded as historical: Mohammad was the son of 'Abd Allah, the son of 'Abd al Mottalib, the son of Háshim, the son of 'Abd Manáf the son of Qoçayy. I will not enter now on the genealogy of the Arabic tribes, though valuable the materials furnished by Tabary may be, because we have a systematic work and a dictionary on this subject, the former is called Qáláyid al Jumán, and the latter Niháyat-al-arab, both are by Qalqashandy.

P. 59. Mohammad's first journey to Syria and his acquaintance with Bahyrá from Ibn Isháq. After this one leaf is wanting.

P. 63. His marriage with Khadyjah chiefly from Ibn Isháq and Wáqidy. After his marriage Mohammad lived in the house of his wife. It was subsequently bought by Mo'awiyah, and converted into a place of worship. It is probably the same place which is visited by pilgrims as the house in which Fátimah was born. It is not far from the Ka'bah and lies to the N. E. of it.

P. 68. The re-construction and previous history of the Ka'bah. The account of the Jorhomites which occurs in this chapter, would be interesting was it not already known from the kitáb Alaghány and from Mas'údy.

P. 77. The year and date on which Mohammad received the first revelation; Tabary mentions here many original traditions. As to the year, the accounts are almost unanimous that he had completed the fortieth year of age and as to the date, some mention the 18th of Ramádhán, others the 24th of the same month and others the 17th.

P. 82. Miracles proving that he was a prophet. The chapter on miracles in the Mishkát, contains all the traditions mentioned by Tabary and many more.

P. 86. On the beginning of his mission. This is the most important point in the life of Mohammad, and as orientalists have taken

little pains to illustrate it, I extract here the information contained in Tabary.

The account followed by most biographers of Mohammad is, that contained in a tradition of 'Áyishah which runs as follows in Bokhâry, edition of Dehli, p. 1. "I have been informed by Yahyá b. Bokayr that he has been informed by al Layth from 'Oqayl from Ibn Shahâb (i. e. Zohry,) from 'Orwah b. al Zobayr from 'Áyishah the mother of the faithful that she said, the first kind of inspiration which the prophet received were visions of a pious character in his sleep, whenever he had a dream it was as true and clear as the dawn of morning; after this God filled him with a love for solitude; he used to spend his time in seclusion in a cave in mount Hirâ and there he used to perform tahannoth, this means devotional exercises for several nights, and then he returned to his family. He used to take provisions with him for the time of the tahannoth, and when they were exhausted he used to return to Khadyjah, and he fetched new supplies for the same purpose. At length the truth came to him whilst he was in the cave of Hirâ. The angel came to him and said, Read. I answered, I wont read.* The angel seized me and squeezed me, as much as I could bear, then he let me go and said again, Read! I answered, I wont read. Then he seized me a third time and said, Read, in the name of thy Lord the Creator, who has created man of congealed blood, Read, for thy Lord is the most gracious. The prophet much alarmed by this apparition returned to his wife Khadyjah, and said, Wrap me up; and they did wrap him up until he was relieved from his fear. Then he told Khadyjah what had happened, and said, I fear for myself (i. e. I fear I am mad or possessed by evil spirits), and she said, God beware! He will never inflict such punishment upon thee, thou art kind to thy relations, helpest the distressed, assistest the needy, art hospitable to strangers and thou contributest towards the liquidation of the debts of others. Then Khadyjah went with him to her cousin Waraqah b. Nawfal. He was a man who had embraced the Christian religion during the time of paganism and he knew writing Hebrew, and he wrote as much of the gospel in Hebrew as God pleased that he should write. He was an old man and had become blind. Khadyjah said to

* Literally I am not reading. On the import of this idiom, see my Life of Mohammad, page 95, note.

him, "O cousin, listen to thy cousin, and Waraqah said, O cousin, what hast thou seen? The prophet told him what he had seen: Waraqah observed, This is the Nomos which God has sent down upon Moses, O that I was young, O that I might be alive when thy people will expel thee. The prophet said, Will they expel me? Yes, replied Waraqah, no man has ever brought a message like the one which thou bringest who has not been persecuted. If I was to live I should assist thee most powerfully. Waraqah died soon after. And Mohammad received no new revelation after this for some time." Ibn Isháq has received this tradition directly from Zohry. His version agrees with that of Bokháry but after the words, "God filled him with love for solitude" he only adds "and nothing was more agreeable to him than to be alone," and then the tradition ends. Waqidy had not received it directly from Zohry but from two of the pupils of Zohry, viz. Ma'mar b. Ráshid and Mohammad b. 'Abd Allah, and they both repeated the words of their master alike. His version agrees with that of Bokháry and Ibn Isháq, but it ends after the words "At length the truth came to him whilst he was in the cave of Hirâ." Tabary received this tradition by two distinct channels from Zohry. His two versions agree with each other except that in one there is a sentence more at the end than in the other; but with the version of Bokháry Tabary's version agrees only as far as the version of Wáqidy goes, viz. to the words "at length the truth came to him whilst he was on mount Hirâ." After these words Tabary's version differs from that of Bokháry not only in the expression but in the sense. Tabary's version continues after the above words: "and he (the truth or angel) came to him and said, O Mohammad, thou art the prophet of God. I fell on my knees, for I had been standing. Then I went away trembling in my whole body and I came to Khadyjah and said, Wrap me up, wrap me up, until I was relieved from my fear. Then he (the angel) came again and said, O Mohammad, thou art the messenger of God. I had previous to this second apparition been so melancholy that I had intended to throw myself down from the heighth of a mountain, and it was whilst I had this intention that he appeared to me and said, O Mohammad, I am Gabriel, and thou art the messenger of God. Then he said, Read. I answered, What shall I read? Then he seized me and squeezed me three times as much as I

could bear, then he said, Read in the name of thy Creator ; and I read and I went to Khadyjah and said, I am afraid for myself, and I related her what had happened. She answered, Be of good cheer, God will never inflict such a punishment upon thee ; thou art kind to thy relations, speakest the truth, helpest the distressed, assistest the needy, art hospitable to strangers, and contributest towards the liquidation of the debts of others. Then Khadyjah went with me to Waraqah b. Nawful and said, Listen to thy cousin. He asked me and I related him what had happened. Waraqah observed, This is the Nomos which God has sent down upon Moses. O that I was young! O that I was alive when thy people will expel thee. I said, Will they expel me? and he answered, Yes, no man has ever brought a message like the one which thou bringest who has not been persecuted. If I was to live I should assist thee most powerfully. The first verses of the Korân after the words Read, &c. were "Nún by the reed and what they write, &c." (Súrah 68) and "O thou covered" (Súrah 74, 1,) and "By the brightness of the morning (Súrah 93," 1,) I transcribe here the text of Tabary and that of Bokháry to enable the reader to compare them.

Text of Bokháry.

حدّثنا يحيى بن بُكير قال اخبرنا الليثُ عن عُقَيل عن ابن
شهاب عن عُروة بن الزبير عن عائشة اُمّ المومنين رضى الله عنها انها
قالت اولُ ما بُدِئَ به رسول الله صلى الله عليه وسلم من الوحى الرؤيا
الصالحة فى النوم فكان لا يرى رويا الاجاءت مثل فلقِ الصُبح ثم حُبِّبَ
اليه الخلاءُ و كان يخلو بغار حِراءٍ فيتحنَّثُ فيه وهو التعبُّدُ ليالى ذوات
العَدد قبلَ ان يَنزِعَ الى اهله و يَتزوَّد لذلك ثم يرجع الى خديجةَ
فيتزوّد لمثلها حتى جاءه الحق و هو فى غار حراء فجاءه الملَكُ
فقال اقرء فقال فقلتُ ما انا بقارئٍ قال فاخذنى فغطّنى حتى بلغ
منى الجُهد ثم ارسلنى فقال اقرء فقلتُ ما انا بقارئٍ فاخذنى
فغطنى الثانيةَ حتى بلغ منى الجهد ثم ارسلنى فقال اقرأ فقلتُ

ما انا بقارئٍ قال فاخذنی فغطّنی الثالثة ثم ارسلنی فقال اقرأ باسمِ ربک الذی خلقَ خلقَ الانسانَ من علق اقرء و ربک الاکرم فرجع بها رسول الله صلی الله علیه و سلم یرجُف فواده فدخل علی خدیجةَ بنت خُوَیلد فقال زَمِّلُونی زملونی فزملوه حتی ذهب عنه الرَّوعُ فقال لخدیجة و اخبرها الخبر لقد خشیتُ علی نفسی فقالت خدیجة کلا و الله ما یخزیک الله ابدًا انّک لتصل الرحمَ و تحمل الکل و تکسب المعدومَ و تقری الضیفَ و تعین علی نوائب الحق فانطلقت به خدیجة حتی اتت به وَرَقة بن نوفل بن اسد بن عبدالعزی بنَ عم خدیجة وکان امرأ تنصر فی الجاهلیة وکان یکتب الکتابَ العِبْرانی فیکتب من الانجیل بالعبرانیة ما شاءالله ان یکتب وکان شیخا کبیراً قد عمی فقالت له خدیجةُ یا ابن عم اسمَع ابنَ اخیک فقال له ورقةُ یا ابن اخی ما ذا تری فاخبره رسول الله صلی الله علیه وسلم خبر ماراٰی فقال له ورقة هذا الناموسُ الذی نزل الله علی موسی یا لیتنی فیها جَذَع یا لیتنی اکون حیا اذ یخرجک قومُک فقال رسول الله صلی الله علیه و سلم أو مُخْرجیّ هم قال نعم لم یاتِ رجل قط بمثل ما جئتَ به الّا عُودیَ وان یدرکنی یومک انصرک نصرًا مُؤزرًا ثم لم ینشب ورقة ان توفی و فتر الوحی *

Text of Tabary.

فحدثنی احمد بن عثمن المعروف بابی الجوزا قال حدثنا وهب بن جریر قال حدثنا ابی قال سمعتُ النعمن بن راشد یحدث

عن الزهرى عن عُروة عن عائشة انها قالت كان اول ماء يبدئ به رسول الله صلى الله عليه وسلم من الوحى الرويا الصادقة كانت تجي مثل فلق الصبح و حُبّبَ اليه الخلا فكان بغار بحرى يتحنث فيه الليالى ذوات العدد قبل ان يرجع الى اهله فيتزوّد حتى فجيهُ الحقُ فاتاه فقال يا محمد انت رسول الله صلى الله عليه فجثوتُ لركبتى وانا قائم ثم رجفت ترجف بوادري ثم دخلت على خديجة فقلت زملونى زملونى حتى ذهب عنى الروع ثم اتانى فقال يا محمد انت رسول الله قال فلقد هممت ان اطرح نفسى من خالق من جبل فتبدّالى حين هممت بذلك فقال يا محمدانا جبريل وانت رسول الله ثم قال اقرأ قلتُ ما اقرأُ قال فاخذنى فغطنى ثلث مرات حتى بلغ منى الجهد ثم قال اقرأ باسم ربك الذى خلق فقرأتُ فاتيتُ خديجةَ فقلت لقد اشفقتُ على نفسى فاخبرتها خبرى فقالت ابشر فوالله لايخزيك الله ابدا والله انك لتصل الرحمَ و تصدق الحديثَ وتودي الا مانة وتحمل الكلّ وتقرى الضيف وتعين على نوائب الحق ثم انطلقت بى الى ورقةَ بن نوفلِ بن اسد وقالت اسمع من ابن اخيك فسالنى فاخبرته خبرى فقال هذا الناموس الذى انزل على موسى ليتنى فيها جذع ليتنى اكون حيًّا حين يخرجك قومك قلتُ اُمخرجيَّ هم قال نعم انه لم يجئ رجلٌ قط بما جئتَ به الا عُودى ولئن ادركنى يومك انصرك نصرا مؤزرا ثم كان اول ما نزل عليه من القرآن بعد اقرأ نون والقلم وما يسطرون

ما انت بنعمة ربک بمجنون وان لک لاَجْراً غیر ممنون وانک لعلی
خُلُقٍ عظیم فستبصر ویبصرون ویا ایها المُدَّثّرقم فانذر والضحی
واللیل اذا سجی حدثنی یونس بن عبدالاعلی قال اخبرنا ابن
وهب قال اخبرنی یونس عن ابن شهاب قال حدثنی عروة ان
عائشة خبرته ثم ذکر نحوه غیرانه لم یقل کان من اول ما انزل علی
من القرآن الی آخره *

The results of the comparison of the versions of this tradition are:

1. The first lines are the same in all versions.

2. The oldest version, that of Ibn Isháq, who died in A. H. 151, is the shortest, in that of Wáqidy who died in A. H. 207, only one sentence is added to that of Ibn Isháq, in the version of Bokháry who died in 256, and of Moslim many details are added which are contradicted by other traditions, contained in the collections of the very same authors. And finally, the version of Tabary, which is the most modern, he having died in A. H. 310, contains at the end some additions to the version of Bokháry, and though, in some respects more correct, is much more confused. It is clear that the tradition is only as far genuine as it goes in Ibn Isháq or in Wáqidy. The reader will observe that as far as the tradition goes in Wáqidy 'Áyishah is speaking, and the prophet is introduced in the third person. The apparition of the angel is related by Mahommed himself, and he speaks in the first person, and in the visit to Waraqah, Mahommed is again introduced in the third person. This leads us to suspect that Bokháry has put three distinct traditions into one, and it will appear from what follows, that each of them is genuine and correct in itself, but that the connexion into which they are brought here is wrong. Tabary in his version of the tradition of 'Áyishah, has equally put three distinct traditions together, but he differs from Bokhary in the order. This shows clearly that they were originally separate.

After this tradition of 'Áyishah, Tabary transcribes from Ibn Isháq the account of what led Mahommed to declare himself a prophet. This account had been communicated to Ibn Isháq by Wahb b. Kaysán,

who had it from 'Obayd b. 'Omayr b. Qatádah, but it can not be called a tradition in the same sense as the sayings collected by Bokháry or Tirmidzy, for it is evident from the wording that Ibn Isháq does not give the text, but only the sense of the story whereas in genuine traditions, it is supposed that the words used by the prophet, or his companions have been faithfully preserved.

This account is somewhat abridged in Abúlfida, edition Adler, I. p. 26, and in every biography of Mohammad ; it would therefore be superfluous to insert here the text or a literal translation. I will merely mention the heads. Mohammad used annually to spend one month in mount Hirá, to perform certain religious ceremonies, which it was usual with the pious men of his tribe, to go through in the same sacred locality. When he had attained his fortieth year of age, and was engaged in these devotional exercises, he had a dream (according to others the angel appeared to him whilst he was walking), in which the angel Gabriel ordered him to read. Here follows a passage in Tabary's text, which is wanting in both copies of Ibn Isháq which I have. The reason of this discrepancy is that the text of Ibn Isháq in general use is that of Ibn Hishám, who had it from Bakáyy who it is said by Sam'ány, was a great liar, and Tabary had his from Ibn Homayd, who had it from Salamah, a pupil of Ibn Isháq. The passage in question runs :

قال ولم يكن من خلق الله احد ابغض الى من شاعر او مجنون
كنت لا اطيق ان انظر اليهما قال قلت ان الابعد يعنى نفسه لشاعر
او مجنون لا يحدث بها عنى قريش ابدا لاعمدن الى خالق من الجبل
فلاطرحن نفسى منه فلا قتلنها فلا ستريحن قال فخرجت اريد ذلك *

"Nothing was more odious to me than poets or madmen (in one version of this saying of Mohammad which is recorded by Wáqidy, it is said 'soothsayers' كاهن), I could not look at them. I therefore said to Khadyjah, He who was the last person of whom such a thing would have been expected, [by this expression he meant himself] is certainly a poet or a madman. But the Qorayshites shall never say such a thing

of me, I will certainly rather go to the top of a hill and throw myself down and kill myself and have rest. (It appears from numerous passages of the Qorân that the Qorayshites did really accuse him of being merely a poet or a soothsayer or mad ;) I went away with the intention of destroying myself (what follows is in Ibn Hishám's castigated edition of Ibn Isháq). When I was in the middle of the mountain I heard a voice, &c." The angel appears to him and tells him that he is the prophet of God. This apparition of the angel is twice alluded to in the Qorân. When he comes home he again expresses his fear of being mad, and says to Khadyjah, He who is the last person on earth of whom such a thing was to be expected is certainly a poet or he is a madman. This passage is again omitted by Ibn Hishám. It runs in the original قلت لها ان الابعد لشاعر اوهو مجنون. And now Khadyjah went to Waraqah, and it was on this occasion that the conversation took place mentioned by Bokháry.

As in Bokhary's version of the tradition of 'Áyishah, thus in this account of Ibn Isháq only the beginning, that is to say, the story in which Mohammad is ordered to read, is exact ; in the other details the facts are not correctly put together. And this observation applies generally to most traditions in which more than one fact is recorded.

It is admitted by all authors that Waraqah was dead when Mohammad assumed his office, and it will appear from what follows that Mohammad assumed his office immediately after the angel had detained him from committing suicide ; the visit to Waraqah must therefore have taken place before this apparition. As Mohammad resided in the quarter of Makkah, inhabited by the Asadites, and as Waraqah the cousin of his wife was an Asadite, he was probably his neighbour ; such visits may therefore have been frequently repeated, and it is apparently for this reason, that the accounts of the interview with Waraqah differ so much from each other : they refer to different visits. Bokháry says that Khadyjah went with her husband to Waraqah, after the fit in which he was ordered to read. Ibn Isháq says, that she went by herself and that Mahommed subsequently met Waraqah at the Ka'bah, and in another tradition of Ibn Isháq it is said, that she sent Abú Bakr to Waraqah. The latter tradition is so interesting that I make no apology for transcribing it here from the Oyún alathr : "The prophet said to Khadyjah, When I was alone I heard a call (or

a voice), I fear it is not all right with me. Khadyjah replied, God beware! such will never happen, for thou keepest to thy engagements, art kind to thy relations, and speakest the truth. Subsequently Abú Bakr came and Mohammad was absent, Khadyjah mentioned to him the circumstance and said, Go with Mohammad to Waraqah: when Mohammad came in, Abú Bakr said, Let us go to Waraqah. Mohammad asked, Who has told thee? and he answered, Khadyjah: they went and they told him every thing. Mohammad said, When I was alone I heard a voice from behind calling Mohammad! Mohammad! I ran away from it, taking flight. Waraqah said, Thou must not do that; when thou hearest the voice again, stand still and listen what the voice has to say and come to me and tell me. Mohammad again heard the voice "O Mohammad! O Mohammad!" In the name of the Merciful and Compassionate God. The voice recited the first Súrah of the Qorân and added. "There is no God but the God," Mahommed went to Waraqah, and told him what had happened. Waraqah said, "Be of good cheer, I bear witness that thou art (the Paraclete) whom Christ has predicted, and that thou hast the prospect of something like the law of Moses, that thou art a prophet sent by God, that thou wilt be ordered to carry on sacred wars after the day may have come. O that I was alive at that time! I should certainly assist thee in thy struggles. When Waraqah had died, Mohammad said, I have seen the priest in Paradise dressed in a robe of silk. He has certainly believed in me, and declared that I spoke the truth."

وفى رواية يونس عن ابن اسحق بسنده الى ابى ميسرة عمرو
بن شرحبيل ان رسول الله صلى الله عليه وسلم قال لخديجة انى اذا
خلوتُ وحدى سمعت نداء وقد خشيت والله ان يكون لهذا امر
قالت معاذ الله ماكان الله ليفعل ذلك بك فو الله انك لتودى
الامانة وتصل الرحمَ وتصدق الحديث فلما دخل ابوبكر وليس رسول
الله صلى الله عليه وسلم ثُمَّ ذكرت خديجة له فقالت يا عتيق اخذ
ابوبكر بيده وقالت انطلق بنا الى ورقة فقال ومن اخبرك قال خديجة

فانطلقا عليه فقصّا عليه فقال انى اذا خلوتُ وحدى سمعت نداء
خلفى يامحمد يامحمد فانطلق ها ربالک ثم ايتنى فاخبرنى فلما خلانا اتا
يا محمد يا محمد قل بسم الله الرحمن الرحيم الحمد لله رب العالمين
حتى بلغ ولا الضالين قل لا اله الا الله فاتى ورقة فذكرله ذلك فقال
له ورقة ابشر فانا اشهد انّک الذى بَشّربه ابن مريم وانک على مثل
ناموس موسى وانّک نبى مرسلٌ وانّک ستومر بالجهاد بعديومک
هذا ولئن ادركنى ذلک لاجاهدنّ معک فلما توفى ورقة قال رسول
الله صلى الله عليه وسلم لقد رايتُ القَسّ فى الجنة وعليه ثياب حرير
لانه آمَن بى وصدقنى *

That Mohammad was subject to hallucinations of his senses for several years is attested by a tradition in the Mishkât, that he was considered a madman is allowed in the Qorân, and that Waraqah was consulted regarding his state of mind, is stated in two traditions preserved by Wáqidy, but that he so early duped his friends, though probable, appears as far as I know only from this tradition.

In Bal'amy's Persian translation of Tabary, it is stated on the occasion of Khadyjah's visit to Waraqah, that she was acquainted with the history of the prophets and had read the scriptures. No mention of this fact is made in the Arabic text with which in truth the Persian translation has very little in common.

After Mohammad had received the first revelation, an intermission of revelations took place, which according to a tradition in the Miskât lasted six months, or two years, or two years and a half. The latter period squares best with other facts. It is stated in Bokhâry's version of the tradition of Ayishah, that Mohammad after the vision in which he was ordered to read went to his wife, and said, "Wrap me up," and that the intermission of revelation took place after this event. In a tradition of Jábir, equally recorded by Bokhâry, it is stated that the scene on the occasion of which the Súrah of the Qorán was revealed,

which begins with the words "Wrap me up," took place after the intermission of revelation. It is also stated in Bokhâry that they not only wrapped him up but poured cold water over him, which leaves us to infer that he had a fit. The tradition of Jábir is also in Tabary in the same terms as in Bokhâry, and there is besides another tradition mentioned on the same subject which I transcribe here. Zohry says, "No revelation came to the prophet for some time. He was very sorrowful at this intermission, and went to the summits of mountains to throw himself down from them. But as often as he was at the top of a mountain, Gabriel appeared to him and said, Thou art the prophet of God. This cooled his excitement and gave him again courage. Mohammad used to mention this subject, saying, "One day whilst I was walking I saw the angel, who had appeared to me (in a dream) on mount Hirá. He was sitting on a throne between heaven and earth. Being much frightened by this apparition, I returned to Khadyjah and said, 'Wrap me up,' and we, (says Khadyjah,) did wrap him up ;" and then the verse of the Qorân was revealed. "O thou wrapped up," &c.

حدثنا محمد بن عبد الاعلى قال حدثنا ابن ايوب عن معمر
عن الزهرى قال فترالوحى عن رسول الله صلى الله عليه وسلم فترة فحزن
حزنا جعل يعدو الى رؤس شواهق الجبال ليتردا منها فكلما دنى
بذروة جبل تبد اله جبريل صلى الله عليهما فيقول انك نبى الله
فيستكن لذلك جاشه و ترجع اليه نفسه فكان النبى صلى الله عليه وسلم
يحدث عن ذلك قال فبينما انا امشى يوما اذرايت الملك الذى
كان ياتينى بحرى على كرسيّ بين السماء والارض فحمست منه
رُعْبا فرجعتُ الى خد يجة فقلتُ زَمّلونى فزملناه اى فد ثرناه
فانزل الله عزو جل يا ايها المدثر قُم فانذر وربك فكبّر وثيابك
فطهر قال الزهرى فكان اول شئ انزل عليه اقرا باسم ربك الذى
خلق حتى بلغ مالم يعلم *

It will be observed that there is a contradiction in this tradition. In the first part it is stated that the angel Gabriel appeared to Mohammad several times and spoke to him. Then follows an account in Mohammad's own words from which it would appear, that he saw Gabriel only once, and that he did not speak with him. The latter statement agrees with the Qorân 81, 23. Instead of the statement in the first part of this tradition, we read in other accounts as often as Mohammad was on the point of throwing himself down a precipice, an invisible power kept him back.

This apparition of the angel and the fit by which it was followed ended the intermission of revelations, and henceforth we are told, in the tradition of Jábir, just alluded to, one revelation followed another.

This period in the life of Mohammad, is by far the most interesting, yet nothing has been done by orientalists towards illustrating it from original sources. I do not call the Tárykh Khamys or Abúlfidá or the Insán-aloyún, nor the 'Oyún-alathr original sources, though the latter consists almost entirely of traditions and is very valuable. I may therefore be excused, if I add here the résumé of the preceding observations.

1. Mohammad had dreams of a religious character. It is said this period lasted six months, and as his prophetic career lasted in all twenty years in round numbers, therefore the Musulmáns say, that such dreams are the fortieth part of prophecy.

2. He loved solitude and performed ascetic exercises, on mount Hirâ in conformity with the habits and rites of his pagan fathers.

3. Soon after he had attained forty years of age, he had a dream in which he was ordered to read, and this is considered as the first revelation, but he did not immediately assume his office. This is called the beginning of the nabúwat.

4. The intermission of revelations takes place, which lasted two years and a half. During this time, we have good reasons to believe he prepared himself for his office.

5. It was during this period, that Waraqah declared that Mohammad was not insane, nor possessed by evil spirits but that he was a prophet.

6. The angel appears to him and prevents him from committing suicide; he has a fit and declares himself a prophet. This is called the beginning of the risálat. For a further illustration I refer the reader to my life of Mohammad, pp. 94 to 112.

Page 98. Abú Jáfar (i. e. Tabary) observes: "The first law of the code of the Islám, which was given by God to Mohammad, after there had been established the unity of God and the abjuring idolatry and polytheism, was the injunction of prayers."

قال ابوجعفر ثم كان اول شي فرض الله عزوجل من شرايع الاسلام عليه بعد الاقرار بالتوحيد ويلبرآة من الاوثان والاصنام وخلع الانداد الصلاة فيما ذكر *

Many authors place the promulgation of the law of prayer (erroneously) eighteen months before the Hijrah; this passage which rectifies this error is of some importance. Tabary transcribes the circumstances under which Mohammad received this law from Ibn Isháq.

Page 99. The tradition of Anas on the transfiguration or ascension to heaven of Mahommed. This is the most celebrated tradition on this subject, and is also in the Mishkát, in the Taysyr, in the Shifá, &c., but the version in Tabary differs in some points from the usual version.

Page 181. On the first followers of Mohammad, Tabary inserts the statements of Ibn Isháq and Wáqidy, and gives same original traditions. The most striking tradition is the following of Mohammad b. Sa'd, "I asked my father: Was Abú Bakr the first among you who embraced the Islám? He answered no—more than fifty men had embraced it before him, but he was the most distinguished in religious zeal among us."

قلت لابى اكان ابوبكر اولكم اسلاما فقال لا ولقد اسلم قبله اكثر من خمسين ولكن كان افضلنا اسلاما *

There is a great deal of sectarian spirit mixt up in the disputes, who were the first believers? The Sunnies say Abú Bakr, and the Shiahs say Aly.

Tabary was one of the greatest commentators to the Qorân, and in the narrative of the first attempts of Mohammad to spread his religion, and of the persecution of the Oosayshites, he constantly refers to the Qorân and shows on what occasion many of the verses of that book were revealed. This is exceedingly valuable, for it is not easy to bring the Qorân in connexion with the life of its author.

Page 126. A letter of 'Orwah to the Khalif 'Abd al-Malik b. Marwân which I transcribe here. "At first when he, that is to say, the Messenger of God, preached to his people the doctrine which God had revealed to him, and began to diffuse the light which God had sent to him, they did not much differ from him, and they were half inclined to listen to him, (i. e. to follow him,) but when he mentioned their Taghúts, shrines of idolatrous worship, there came some men of the Qoraysh tribe, from Táyif who had property. They denied the truth of what he said, they were very violent against him and disapproved of his preaching, and they encouraged their followers to be insolent against him, and the generality of the people left him, and only those whom God preserved remained staunch. They were few, and matters remained thus, as long as God had decreed that they should remain. At length the heads of the families of Makkah agreed to force those of their children, brothers and kinsmen, who followed him, to forsake the religion of God. This persecution entailed great hardships upon his followers. Some forsook him, but as many as God pleased, remained staunch. When the Moslims were exposed to these persecutions, the prophet ordered them to emigrate into Abessynia. In Abessynia there was a righteous king whose name was Najáshy. No one in his country had to suffer injustice. Abessynia was a place of commerce for the Qorayshites, where they found protection and made a very good profit. It was altogether a good market. The prophet ordered them to emigrate thither, and the common people (who had no protection) from among the Moslims went thither to avoid the persecutions at Makkah; but he himself remained and did not go away. This state of things continued for some years, the Qorayshites were very violent against the followers of the new religion. After that it spread, and men from among their nobles embraced it."

حدثنا علي بن نصر بن علي الجهضمي و عبد الوارث بن عبد
الصمد بن عبد الوارث و قال عبد الوارث حدثني ابي قال حدثنا
ابان الوطار قال حدثنا هشام بن عروه عن عروة انه كتب الى عبد الملك
بن مروان اما بعد فانه يعني رسول الله صلى الله عليه و سلم لما دعا
قومه بما بعثه الله له من الهدى والنور الذي انزل عليه لم يبعد وامنه

اول ما دعاهم و كانوا يستمعون له حتى ذكر طواغيتهم وقدم ناس من الطايف من قريش لهم اموال انكروا ذلك عليه و اشتدوا عليه وكرهوا ما قال و اعزوا به من اطاعهم فانصفق منه عامة الناس الا من حفظه الله عزوجل منهم و هم قليل فمكث بذلك ما قدر الله ان يمكث ثم ائتمرت رؤوسهم بان يفتنوا من تبعه عن دين الله من ابنائهم واخواتهم وقبائلهم فكانت فتنة شديدة الزلزال على من اتبع رسول الله صلى الله عليه وسلم من اهل الاسلام فافتتن من افتتن وعصم الله منهم من شاء فلما فعل ذلك بالمسلمين امرهم رسول الله صلى الله عليه وسلم ان يخرجوا الى ارض الحبشة وكان بالحبشة ملك صالح يقال له النجاشى لايظلم احدٌ بارضه و كان يُثني عليه مع ذلك صلاح وكان ارض الحبشة متجرا لقريش يتجرون فيها يجدون فيها رفاعا من الرزق امنا ومتجرا حسنا فامرهم بها رسول الله صلى الله عليه وسلم فذهب اليها عامتهم لما قهروا بمكة وخاف عليهم الفتن ومكث هو فلم يبرح فمكث بذلك سنوات يشتدون على من اسلم منهم ثم انه فشا الاسلام فيها ودخل فيها رجالٌ من ذوى اشرافهم •

The aversion which the Qorayshites conceived against Mohammad on account of his attacks on their idols, caused him to come to a compromise with their religion, and this is the most important feature in his creed, for had he preached Deism and borrowed from the tenets of the Jews and Christians, his sect would have merged into the Christian religion in measure, as his followers proceeded in knowledge, but the admixture of the pagan rites of the Ka'bah made the Islám national, and were an insuperable barrier against such a union. In one instance Mohammad, in writing a pretended revelation appears to have acknowledged the efficacy of prayers offered to the idols of the Ka'bah. Tabary, pages 140 *et seq.*, gives two most important traditions on this head, the former is taken from Ibn Isháq, yet I cannot find it in the two copies of that author, and it seems to have been omitted from the edition, which has been preserved, by the lying Bakáyy or by Ibn Hishám. I therefore insert it. The second tradition agrees almost literally with a tradition in Wáqidy, who gives the following autho-

rity for it: Yúnos b. Moh. b. Fodhálah Tzafary, who had it from his father. His Secretary Ibn Sa'd added another authority, viz. Kabis b. Zayd from al-Mottalib b. 'Abd Allah b. Hantib حنطب.

The first tradition runs in Tabary: When the prophet saw that his people forsook him, he was much grieved to observe that they turned away from the revelation which he brought from God. He therefore conceived a desire in his mind, that God might send him a revelation calculated to conciliate his people to him. And filled as he was with a love for his people, and with a wish for a union with them, he cherished the idea that there might be some means of alleviating the persecutions to which he was exposed from them, and he went so far as to meditate on it, and to wish for it; whilst his mind was thus occupied, God sent him the revelation (Súrah 53): "By the star when it passes on away," &c., and when he came to the words "Do you see the idol al-Lát and al-'Ozzá and Manáh who is the third?" the devil prompted him to say that which he (Mohammad) had revolved in his own mind, and what he had wished, that it might be sent through him to his people, viz. "Do you see 'those noble swans? their intercession will be graciously received by God.' When the Qorayshites heard this they were delighted, and they were pleased with the manner in which he had mentioned their gods, and they listened to him. As to his followers they were persuaded that whatever message their prophet brought them from God, was without error or mistake. And when he came to the end of the Súrah, where it is said, and therefore, "Fall down before God and worship him," he prostrated himself, and his followers did the same, acknowledging herewith that they considered what their prophet had said was true and in obedience to his order; and every man who was present in the place of worship, observed this ceremony, the idolaters among the Qorayshites not excepted, they being satisfied by the manner in which he had spoken of their gods. There was not a man in the place of worship, whether Moslim or unbeliever, who did not prostrate himself, except al-Walyd b. al-Moghyrah. He was very old (and unable to touch the ground with his forehead), and he therefore, took up a handful of gravel from the ground and touched his forehead with it. After this they left the place of worship, and the Qorayshites dispersed, much pleased with the manner in which he had mentioned their gods, and they said Mohammad has spoken of our

gods in the most handsome manner. He has expressed when he read a revelation, that they were the heavenly swans, and that their intercession would be graciously received by God. The followers of Mohammad who had emigrated to Abessynia, heard that the Qorayshites had prostrated themselves with Mohammad, and they were informed that the Qorayishites had embraced the Islám. Some of them, therefore, left Abessynia and others remained. The angel Gabriel came to Mohammad and said, What hast thou done? Thou hast read before the people a sentence, which I have not brought to thee from God, and thou hast said what thou hadst not been told. Mohammad was exceedingly sorrowful at his error, and he feared the punishment of God. God was merciful to him, and with a view of consoling him, and to convince him that the fault was not so great, he revealed a verse to him to show that there had not been a prophet nor a messenger before him, who had not entertained desires and wishes like him, and that the devil mixed with the wishes of former prophets his own inspirations in the same manner as he (the devil) spoke through the tongue of Mohammad. God abrogated the words prompted by the devil, and confirmed his own revelation, viz. Thou art like some of the prophets and messengers, God revealed to this purpose the words (Qorân 22, 51): "We have sent no messenger nor a prophet before thee, but if he had a desire of his own the devil prompted him some thing (which had the appearance of a heavenly inspiration,) consonant with his wishes, but God abrogates what Satan prompts, and God confirms his signs, for God is knowing and wise." In this manner God relieved his prophet from sorrow, and assured him that he had no cause to fear, and he made void what Satan had prompted regarding the noble swans, and the efficacy of their intercession. Instead of the words of Satan, God placed after the mention of al-Lát, al-'Ozzá and Manáh, the verses which we now read in the Qorân, viz. "Have you male children, and do you think that God has girls (the idols were considered as the danghters of God, and to have daughters was considered ignominious for a family among the Arabs), this is a perverse division! These (viz. al-Lát, al-'Ozzá and Manáh) are only epithets of God, (al-Lát is the feminine of Allah; 'Ozzá of 'Azyz, high, sublime, and Manáh means merciful,) which you and your fathers have given to the idols. God has not revealed (to me) concerning them any thing to authorize their worship. They follow no other than a

vain opinion and what the hearts desire,—yet there has come unto them, the true direction from God. Shall man have what he wishes? The present life and the life to come are God's, and how many angels soever there be in the heavens, their intercession shall be of no avail until after God shall have granted permission unto whom he shall please and shall accept." And therefore, if the intermission of the angels is not accepted by God, how shall that of your idols be acceptable to him? When God had expunged the words which Satan had prompted to the prophet from the Qorân, the Qorayshites said, Mohammad has repented his having attributed to our gods, so high a position in the sight of Allah, he changed what he said and put another passage in its place. The two sentences which the devil had prompted to Mohammad, had fallen into the mouth of the unbelievers, and they became more malicious against the Moslims than they had been before, and increased the persecution. Meanwhile those who on hearing the news that the Qorayshites had embraced the Islám had left Abessynia, arrived in the neighbourhood of Makkah; there they learned that what they had heard of the conversion of the Makkians was premature, and therefore those few of them who entered Makkah did so secretly, or under the protection of some friend. The following men did, on this occasion, come to Makkah, and remained there until the flight to Madynah took place. Of the family of 'Abd Shams remained 'Othman b. 'Affan with his wife Royayyah who was a daughter of the prophet, and Abú Hodzayfah b. 'Otbah b. Raby'ah b. 'Abd Shams, and with him was his wife Sahlah a daughter of Sohayl and some others, there were in all thirty men."

Tabary has a second tradition on the same subject. It rests ultimately like the preceding on the authority of Mohammad b. Ka'b Qoratzy backed by the authority of Mohammad b. Qays, and it seems that it was first taken to paper by Abú Ma'shar, one of their pupils. This Abú Ma'shar is probably not identical with the astronomer of that name, for the latter was born in A. H. 190 and died in A. H. 272; and the former is occasionally mentioned as an authority of Wáqidy who died in A. H. 207.

The tradition runs: "The prophet was sitting in the society of some Qorayshite chiefs (Waqidy adds, round the Ka'bah,) and he wished very much that God might not send him such revelations as were calculated to turn his people away from him. God revealed to him 'By the star

when it passes away,' &c. The prophet read the Súrah as far as the words 'Do you see al-Lát, al 'Ozzá and Manáh?' and the devil prompted him these two sentences: 'Those noble swans; their intercession will be graciously received by God,' and having spoken of the idols, he continued and read the Súrah to the end," &c.

حدثنا ابن حميد قال حدثنا سلمة قال حدثنى محمد بن اسحق عن يزيد بن زياد المدنى عن محمد عن محمد بن كعب القرظى قال لما راى رسول الله صلى الله عليه وسلم تولى قومه عنه وشق عليه ما يرى من مباعدتهم ما جا بهم من الله عزوجل تمنى فى نفسه ان ياتيه من الله عزوجل ما يقارب بينه و بين قومه و كان يسره مع حبه قومه و حرصه عليهم أن يلين له بعض ما قد غلظ عليه من امرهم حتى حدث بذلك نفسه و تمناه واحبه فانزل الله عزوجل والنجم اذا هوى ما ضل صاحبكم وما غوى وما ينطق عن الهوى فلما انتهى الى قول الله عزوجل افرأيتم اللات و العزى و مناة الثالثة الاخرى القى الشيطان على لسانه لما كان يحدث به نفسه و يمنى ان ياتى به قومه تلك الغرانيق العلى و ان شفاعتهن لترتجى فلما سمعت ذلك قريش فرحوا و سرهم واعجبهم ماذكر به الهتهم و اصاخوا له و المومنون مصدقون نبيهم فيما جاهم عن ربهم ولا يتهمونه على خطا ولا وهم ولا زلل فلما انتهى الى السجدة منها وختم السورة سجد فيها فسجد المسلمون بسجود بينهم تصديقا لما جاء به واتباعا لامره وسجد من فى المسجد من المشركين من قريش و غيرهم لما سمعوا من ذكر الهتهم فلم يبق فى المسجد مومن ولا كافر الا سجد الا الوليد بن المغيرة فانه كان شيخا كبيرا فاخذ حفنة من البطحاء فسجد عليها ثم تفرق الناس من المسجد و خرجت قريش وقد سرهم ما سمعوا من ذكر الهتهم يقولون قد ذكر محمد الهتنا باحسن الذكر قد زعم فيما يتلو انها الغرانيق العلى و ان شفاعتهن ترتجى و بلغت السجدة من بارض الحبشة من اصحاب رسول الله صلى الله عليه وسلم وقيل

اسلمت قريش فنهض منهم رجال و تخلف آخرون واتى جبريل
رسول الله صلى الله عليه و سلم فقال يا محمد ماذا صنعت لقد تلوت
على الناس مالم آتك به عن الله عزوجل وقلتَ مالم يُقل لك
فحزن رسول الله صلى الله عليه وسلم عندذلك حزنا شديدا وخاف
من الله خوفاً كثيراً فانزل الله عزوجل و كان به رحيما يعزيه و يخفض
عليه الامرو يجبره انه لم يكن قبله نبى ولا رسول تمنى كما تمنى
ولا احب كما احب الا والشيطان قد القى فى امنيته كما القى على
لسانه صلى الله عليه فينسخ الله ما القى الشيطان واحكم اياته اى فانما
انت كبعض الانبياء فانزل الله عزوجل وما ارسلنا قبلك من رسول ولا
نبى الا اذا تمنى القى الشيطان فى امنيته فينسخ الله مايلقى الشيطان
ثم يحكم الله آياته والله عليم حكيم فاذهب الله عزوجل عن نبيه الحزن
وآمنه من الذى كان يخاف ونسخ ما القى الشيطان على لسانه من
ذكر الهتهم انها الغرانيق العلى وان شفاعتهن لترتضى يقول الله
عزوجل حين ذكر اللات والعزى ومناة الثالثة الاخرى الكم الذكر وله
الانثى تلك اذا قسمة ضيزى اى عوجا ان هى الا اسماء سميتموها
انتم الى قوله لمن يشاو يرضى اى فكيف ينفع شفاعة الهتكم عنده
فلما جاء من الله عزوجل مانسخ ما كان القى على لسان نبيه قالت
قريش ندم محمد على ما ذكر من منزلة الهتكم عند الله فغيرذلك
وجاء بغيره وكان ذَالكَ الحرفان اللذان القى الشيطان على لسان
رسول الله صلى الله عليه وسلم قد وقع فى فم كل مشرك فازدادوا شرا
الى ما كانوا عليه و شدة على من اسلم واتبع رسول الله صلى الله عليه
وسلم منهم واقبل اولئك النفر من اصحاب رسول الله عليه وسلم الذين
خرجوا اليه من ارض الحبشة لما بلغهم من اسلام اهل مكة حين سجدوا
مع رسول الله صلى الله وسلم حتى اذا دنوا من مكة بلغهم الذى كان
تحدثوا به من اسلام اهل مكة بالملاء فلم يدخل منهم احدٌ الا بجوار
مستخفيًا فكان من قدم مكة منهم فاقام بها حتى هاجر الى المدينة

فشهد معه بدرا من نبى عبد شمس بن عبد مناف بن قصى عثمان بن عفان بن ابى العاص بن امية معه امرءته رقيه بنت رسول الله صلى الله وسلم وابو حذيفة بن عتبه بن ربيعة بن عبد شمس معه امراته سهلة بنت سهيل و جماعة آخر معهم عددهم ثلثة وثلثون رجلا •

حدثنى القسم بن الحسن قال حدثنا الحسن بن داوُد قال حدثنى الحجاج قال عن ابى معشر عن محمد بن كعب القرظى ومحمد بن قيس قالا جلس رسول الله صلى الله عليه وسلم فى ناد من اندية قريش كبير اهله فتمنى يومئذ ان لا يا تيه من الله شى فينفرد عنه فانزل الله عزوجل والنجم اذا هوى ماضل صاحبكم وما غوى فقراها رسول الله صلى الله عليه حتى اذا بلغ افرايتم اللات والعزى ومناة الثالثة الاخرى فالقى الشيطان كلمتين تلك الغرانيق العلى وان شفاعتهن لترتجى فتكلم بها ثم مضى فقرا السورة كلها فسجد في آخر السجدة وسجد القوم معه جميعا ودفع الوليد بن المغيرة ترابا الى جبهته فسجد عليه وكان شيخا كبيراً لا يقدر على السجود فرضوا بما تكلم به وقالوا قد عزلنا ان الله يحيى ويميت وهو الذى يخلق ويرزق ولكن الهتنا لهذه تشفع لنا عنده فاذا جعلت لها نصيبا فنحن معك قال فلما امسى اتاه جبريل صلى الله عليهما فعرض عليه السورة فلما بلغ الكلمتين اللتين القى الشيطان عليه قال ماجئتك بهاتين فقال رسول الله صلى الله عليه وسلم افتريتُ على الله وقلتُ على الله عزوجل مالم يقل فاوحى الله عزوجل اليه وان كادوا ليفتنونك عن الذى اوحينا اليك لتفترى علينا غيره الى قوله ثم لاتجد لك علينا نصيراً فما زال مغموماً مهموماً حتى نزلت وما ارسلنا من قبلك من رسول ولا نبىّ الى قوله والله عزيزٌ حكيمٌ قال فسمع من كان بارض الحبشة مِن المهاجرين ان اهل مكة قد اسلموا كلهم فرجعوا الى عشائرهم وقالوا هم احبُّ الينا فوجد القوم قد ارتكسوا حين نسخ الله ما القى الشيطان ثم قام •

The authenticity of this story has been doubted by prejudiced Moslims, but it has been proved beyond a doubt in the Mawáhib Alladannyyah. I transcribe here this important passage-though it is not free from faults.

قد قيل ان هذه القصة من وضع الزنادقة لا اصل لها وليس كذالك بل لها اصل فقد خرجها ابن ابى حاتم و الطبرى و ابن المنذر من طرق و كذا ابن مردويه و البزاز و ابن اسحق فى السيرة و موسى بن عقبه فى المغازى و ابو معشر فى السيرة كمانبه عليه الحافظ عماد الدين ابن كثير و غيره لكن قال ان طرقها كلها مرسلة و انه لم يرها مسندة من وجه صحيح و هذا متعصب بما سياتى و كذانبه على ثبوت اصلها شيخ الاسلام الحافظ ابوالفضل العسقلانى فقال اخرج ابن ابى حاتم و الطبرى و ابن المنذر من طرق عن شعبة عن ابى بشر عن سعيد بن جبير قال قرأ رسول الله صلى الله عليه و سلم بمكة والنجم فلما بلغ افرايتم اللاة و العزّى و مناة الثالثة الاخرى القى الشيطان على لسانه تلك الغرانيق العلى و ان شفاعتهن لترتجى فقال المشركون ما ذكر الهتنا بخير قبل اليوم فسجدَ و سجدوا فنزلت هذه الآية و ما ارسلنا من قبلك من رسولَ و لا نبى الا اذا تمنى القى الشيطان فى امنية الآية و اخرج البزاز و ابن مردويه من طريق امية بن خالد عن شعبة و قال فى اسناده عن سعيد بن جبير عن ابن عباس فيما احسب ثم ساق الحديث قال البزاز لا يروى متصلا الا بهذا الاسناد تفرد بوصله امية بن خالد و هوثقة مشهور قال و انما يروى هذا من طريق الكلبى عن ابى صالح عن ابن عباس انتهى و الكلبى متروك لا يعتمد عليه و كذا اخرجه النجاشى بسند آخرفيه الواقدى و ذكرها ابن اسحق فى السيرة مطولا و اسندها عن محمد بن كعب و كذلك موسى بن عقبه فى المغازى عن ابن شهاب الزهرى و كذا ابو معشر فى السيرة له عن محمد بن كعب القرظى و محمد بن موسى بن قيس و اورده من طريق الطبرى و اورده ابن ابى حاتم من طريق

اسباط عن السدى ورواه ابن مردويه من طريق عباد بن صهيب
عن يحيى بن كثير عن الكلبى عن ابى صالح و عن ابى بكر الهذلى
و ايوب عن عكرمة و سليمان التميمى عن من حدثه ثلاثة عن ابن
عباس و اوردها الطبرى ايضاً من طريق العوفى عن ابن عباس و
معناهم كلهم فى ذلك واحد و كلها سوى طريق سعيد بن جبير اما
ضعيف و اما منقطع لكن كثرة الطرق تدل على ان للقصة اصلا مع
ان لها طريقين آخرين مرسلين رجالهما على شرط الصحيح احدهما
ما اخرجه الطبرى من طريق يونس بن يزيد عن ابن شهاب حدثنى
ابوبكر بن عبد الرحمن بن الحارث بن هشام فذكره نحوه و الثانى ما
اخرجه ايضا من طريق المعتمر بن سليمان وحماد بن سلمة فرقهما عن
داؤد بن ابى هند عن ابى العالية قال الحافظ بن حجر و قد تجرأ
ابن العربى كعادته فقال ذكر الطبرى فى ذلك روايات كثيرة لا اصل
لها و هو اطلاق مردود عليه و كذا قول القاضى عياض هذا الحديث
لم يخرجه اهل الصحة ولا رواه ثقة بسند سليم متصل مع ضعف نَقَلَتِه
و اضطراب رواته و انقطاع اسناده و كذا قوله و من حملت عنه هذه
القصة من التابعين المفسرين لم يسندها احد منهم ولا رفع الى صاحب
و اكثر الطريق عنهم فى ذلك ضعيفة و اهية قال و قد بين البزاز انه
لا يعرف من طريق يجوز ذكره الا طريق ابن بشر عن سعيد ابن جبير
مع الشك الذى وقع فى اصله و اما الكلبى فلا يجوز الرواية عنه لقوة
ضعفه ثم رده من طريق النَّظَر بان ذلك لو وقع لارتد كثير مَن اسلم
قال ولم ينقل ذلك انتهى و جميع ذلك لايتمشى على القواعد فان
الطريق اذا كثرت و تباينت مخارجها دل ذلك على ان لها اصلا و قد
ذكرنا ان ثلثة اسانيد منها على شرط الصحيح وهى مراسيل يحتجّ
بمثلها من يحتج بالمرسل و كذا مَن لا يَحتجّ به لاغضا وبعضها ببعضٍ •

It is likely that it was not the angel Gabriel who reprimanded the prophet, for going so far as he did in his compromise with the idolaters ;

but his followers who were much more sincere in their faith than Mohammad himself. 'Omar disapproved even that any respect should be paid to the black stone of the Ka'bah, "'Omar standing before the black stone said, according to Azraqy (*apud* Burckhardt's Travels to Arabia, p. 308): 'I know that thou art a mere stone that can neither hurt nor help me, nor should I kiss thee had I not seen Mohammad do the same.'" Zamakhshary, Kashshâf to Sûrah 17, 75, relates a story, which shows how ready the prophet would have been to compromise himself with the pagans, had he not been prevented by his disciples: The Thaqyfites said to the prophet, We will not submit to thy orders unless thou grantest us certain privileges of which we may boast before other Arabs, viz. that we shall pay no tithes, that we shall not be obliged to go to war for the religion, nor to prostrate ourselves in praying; that usury which we may make on others be our property, but usury which others make on us be void, and that we shall have the idol al-Lât one year longer, and not be obliged to break it with our own hands at the expiration of the year, and that thou shalt defend us against any one who may invade our valley of Wajj, or attempt to cut down our trees, and if the Arabs ask thee, Why hast thou made this agreement? say, God has ordered me to enter into it. They brought him their deed and he dictated: "In the name of the most merciful God, this is the document of agreement between Mohammad the messenger of God, and the Thaqyfites, that they shall not be called upon to pay the tithes, nor to assist in war," when this was written they said 'and not prostate themselves.' The prophet remained silent, and they said to the writer, Write! 'and not prostrate themselves.' The writer looked to the prophet. 'Omar stood up and drew his sword, and said, You have filled the heart of our prophet with contagion, may God fill your hearts with fire! They replied, We are not talking to thee, we are speaking with Mohammad; then the verse of the Qorân 17, 75 was revealed. 'They nearly succeeded in misleading thee from what we have revealed to thee, and in causing thee to invent something else in our name, but at the right moment a friend reprehended thee.'"

روى ان ثقيفا قالت لنبى صلى الله عليه لا ندخل فى امرك
حتى تعطينا خصالاً نفتخر بها على العرب لانعشر ولا نحشر ولا نجبى

فی صلواتنا وکل ربالنا فهولنا وکل ربا علینا فهو موضوع عنا وان تمتعا باللات سنةً ولا نکسرها بایدینا عندراس الحول وان تمنع مَن قصد وادینا وج فعضد شجرنا فانّ اسالتک العرب لم فعلت ذلک فقل ان الله امرنی به وجاوا بکتابهم فکتب بسم الله الرحمن الرحیم هذا کتاب من محمد رسول الله صلی الله علیه وسلم لثقیف لا یعشرون ولا یحشرون فقالوا ولا یحبّون فسکت رسول الله ثم قالوا للکاتب اُکتب ولا یحبیون والکاتب ینظر الی رسول الله صلی الله علیه وسلم فقام عمربن الخطاب فسل سیفه وقال اسعرتم قلب نبینا یا معشرثقیف اسعر الله قلوبکم ناراً فقالوا لسنا نکلّم ایّاک انّما نکلّم محمد *

The pious Baydhawy who is the author of an abridgement of the Kashshâf, carefully omits the latter part of the story, and instead of the condition that Mohammad should defend the valley of Wajj, (i. e. Táyif,) he says, that he should declare it sacred, in the same manner in which the territory of Makkah was sacred.

The farther back we go in examining the records regarding the character of Mohammad, the stronger they impress us with the conviction, that he was a man of great poetical genius ; but like most exalted men, he was weak and unpractised in action and a barefaced imposter.

I leave it for another opportunity to give a notice of the remainder of this volume of Tabary. Since writing the above I have found a fragment of the first volume of the same author. In looking over some worm-eaten leaves the remnants of a valuable library at Delhi, I saw two sheets, in all 38 pages, written in a very ancient bad hand, and observed the isnád "Ibn Homayd from Salamah, &c." which I know is the isnád of Tabary, and on examination it turned out that the two sheets in question, were a fragment from the first volume of Tabary, and contain part of the history of Abraham. This discovery is in so far important as it gives us the assurance that copies of Tabary are to be found in India.

Note on Patna Boulders. By Captain E. L. OMMANNEY, *Executive Engr. 3rd Division, Lower Provinces.*

Considerable interest has been excited by the discovery, near Niemanadowah Dák Bungalow, 14 miles from Patna, of a large quantity of round balls or blocks of stone similar to those met with in the beds of mountain torrents, or on the sea coast.

2. At first this circumstance was thought to afford additional proof, if any were wanting, of the former junction of the Soane and Ganges at Patna, as it was supposed that no torrent inferior to the Soane could have brought down pebbles of this size, measuring on an average five inches in diameter; but as the Soane, as far as I have been able to ascertain at present, does not bring down stones of this size, and is about 9 miles distant from the spot, it seems probable that these stones, sand and gravel may come under the denomination of Alluvium or Diluvium, and have been originated locally, that is, been derived from rocks within a few miles of the spot where they are now found.

3. The nearest rocks are the Barábar hills of which the granite peak of Kowā Dól forms a conspicuous object, and are distant about 30 miles south.

4. The slip or train from which they have been excavated is 1400 feet in length by 10 or 12 in breadth. They are imbedded in a kind of bluish clay, resembling marl, at a depth of from 1 to 4 feet.

5. The stones are not all of the same kind, some being more rounded at the edges and oval-shaped than others, and of different colors from black to grey and white, but they all appear to be of granite of different qualities of grain.

6. The very coarse-grained stones, seem quickly to decompose on exposure to the air.

7. The stones do not lie at the bottom of a valley, but on rather higher ground than any in the immediate vicinity, some of an oval form lie on their flat sides with the largest diameter nearly east and west; but some lie on edge without regularity, chiefly across the direction of the train, and separated from each other by a small quantity of mud or clay.

8. The sand and gravel is composed of a mixture of particles of various substances, quartz preponderating; the grains are of middling

size, angular and rounded ;—in the mass being of a lightish red color, the bed of sand extends from Mussourie to the Marhar river 4¼ miles, and exceeds 20 feet in depth, being on an average about 6 feet below the surface.

9. The stones in the gravel are of different kinds and sizes and are similar to what are now met with a short distance from the mouth of the Soane ; they appear to be of similar quality to the large stones and like the shingle on the sea coast.

10. The sand, a specimen of which is sent, is now being used for covering the surface of the road in the vicinity, to serve as ballast for kankar metalling ; it lies on the surface of the spot whence it is brought ; the same quality of sand is procurable at Teringna : underneath the upper sand at a depth of about 5 feet below the surface and underneath the gravel, is another bed of sand more than 20 feet deep ; the other specimen of sand was dug from a hole close to the road opposite the Dák Bungalow, and seems to be of similar quality. The direction of the bed of sand appears to be from south-west to north-east, which corresponds with the slope of the country from the bank of the Soane to Monghyr.

11. At the spot where the stone was found, water is met with about 4 feet below the stone or 9 feet from the surface.

12. Another circumstance in connection with this stone is deserving of remark ; at No. 1, in the accompanying rough sketch, a nail was dug out from amongst a large quantity of these stones, which were firmly imbedded in clay with a great quantity of broken bricks both above and below them, and this was continued for a distance of 20 feet in length and 2 feet below the surface ; at Nos. 2, 3, 4, are old wells in a patch of scrub jungle, and I understand that there are several more in nearly the same line.

13. This would seem to point out the site of some ancient town or building, and the natives have a tradition of the kind, and it seems almost probable, that it may have been destroyed by some sudden irruption or deluge from the Soane or other mountain torrent in the more immediate vicinity, such as the great and little Pompon or Murhar river.

14. Should such have been really the case the stability of any raised embankment or railroad from Gya to Patna is much to be doubted, if

this tract of country is ever subject to such sudden and extraordinary irruptions as these stones and gravel would seem to indicate.

15. From the rapid way in which the coarser stones decompose, when exposed to the air, there can be no doubt that the whole of the quartz sand found in this neighbourhood arises from the decomposition of these boulders, which may have been rounded by the action of water or may be in their original forms.

16. A sketch of the granite groups in the Barábar hills and of the granite peak, Kowá Dól, 365 feet high, in the same hills is given in Lieut. Sherwill's geological map of Behar.

17. The boulders there shown have evidently been rounded by the wear arising from exposure to the air and the ordinary drainage of the surface; and no doubt beds of alluvial matter must have been deposited to a considerable depth in their vicinity. These may have been either transported to their present position by a deluge, or may have been gradually carried there, or these stones and gravel may be portions of rocks once similar to the granite groups in the Barábar hills, which have been disintegrated in situ from the action of water or other causes.

18. Maccallock in his geological classification of rocks under the head of Alluvia, says, "In favorable circumstances of position, these disintegrated rocks remain in their places forming beds or masses of loose materials, consisting of larger fragments of the more solid parts mixed with the clay and sand resulting from the more complete decomposition of others. This occurrence takes place chiefly in granite."

19. The following is a list of specimens to be despatched by steamer.*

Nos. 1, 2, 3. Stones taken from the top of the heap that has been placed along the side of the road for metalling.

No. 4. A broken one from ditto in a state of decomposition.

No. 5. Taken out of the earth on the 7th June 1849, with a portion of the clay in which these stones are found imbedded still adhering to it.

No. 6. A stone taken from the bottom of a heap by road-side.

A few of the small shingle or pebbles which are found imbedded amongst the large stones. A few of the bricks in which the stones

* Sutledge, now daily expected.

were in one place firmly imbedded, also a nail found at the same spot. A bag containing a specimen of the gravelly sand, which is being used for covering the surface of the road.

No. 7. A specimen of sand dug out by the road side opposite the Dák Bungalow.

No. 8. A specimen of sand from Dackinpura west of Meitápura and close to Bánkipura (Patna), where it is conjectured the river Soane once had its bed.

Note on the Strata cut through in excavating for Coal in Wádi Araba, eastern desert of Egypt, by Hekekyan Bey. *Communicated by Captain* T. J. Newbold.

Note.—Wádi Araba is one of the transverse vallies that cross the limestone and sandstone formation of the eastern desert of Egypt, and which formed, in ancient times, the principal channels of commerce between the Nile and the Red Sea. It debouches on the *rif* (cultivable portion of the valley of the Nile) near *Deir Biád*, opposite Benisuef, in about Lat. N. 30° 50′, and leads to the interesting monasteries of St. Anthony and St. Paul in the desert. The former is about 18 miles, and the latter about 9 miles distant from the Red Sea. The *Máázi* tribe of Arabs, regards the *Wádi* as belonging to their country, and set a high value on the springs of fresh water with which it and the subordinate *Wádis* abound.

Wádi Araba literally signifies Valley of chariots, and hence has been supposed to have derived its name, from having been the road by which Pharoah with his chariots and horsemen, pursued the children of Israel to the Red Sea. Sir G. Wilkinson ridicules this idea, and asserts that the valley, which is of considerable breadth, has received its name from the *plaustra* or carts, that formerly carried provisions to the two monasteries. This, however, the Arabs in the vicinity denied to me, and the probability is that the name is of far more ancient date, and was given in consequence of its being the road by which stones from the ancient alabaster quarries in the vicinity were conveyed on cars to the Nile. In like manner the road to the Porphyry quarries from the Nile, was termed "*Sikket el Arabiyeh.*"—T. J. N.

Section of Strata in *Wádi Araba*.

An inclined plane open to the sky leads down to the shaft, with steps to the first water drain, the rope of which is provided with two buckets, one at each end, so that one bucket reaches the wooden platform of the stage below, when the other is at the superior stage. A stationary rope serves to prevent the bucket from swinging as it descends with its load; the rope being slightly held with one hand to steady it.

The first stage in order of descent, contains three feet of alluvial matter; three feet of *glauconic* or greenish clay; twenty-four feet of yellowish clay with *gryphæa virgulata* in great quantities; one foot green grit or sandstone; six feet of a yellow ferruginous sandstone;—all of which, except the alluvium, are ascribed to the chalk formation.*

Seventy-five feet of plastic refractory clays, in regular layers of white, grey, blue, and yellow. Each layer is nearly three feet in thickness, the series being repeated in the same order to the entire depth of seventy-five feet. In all these clays are found a few *gryphæa* of different species, and some bivalves.

At the depth of about one hundred and twelve feet the clays cease to appear.

Below them there are, in order, six feet of white, marly, shell limestone, containing several species of the family Echinidæ, and others of old date, three feet of marly, grey limestone—very compact and without shells; two feet of dark brownish clay, very pure. A series of refractory, white, grey and bluish clays reach down to the depth of 140 ft. below the surface, succeeded by fifteen feet of a blackish slaty clay;—all without fossils. Below this are seven feet of slaty clays of greyish hue, intercalated with grey, argillaceous, compact limestone containing two species of ammonites six inches in diameter, and traces of bituminized vegetable substances. One foot quartzose sandstone, compact, white,—with veins of a reddish and greyish colour, and fragments of bituminous plants;—three feet of compact greyish limestones embedding small nodules of galena, and some bivalves *(cardium)*;—one foot of psammitic sandstone, quartzose, white, compact;—one foot of the same more compact,—fracture slaty,—colour blackish grey;—one foot

* From the bottom of the chalk formation down to 182 ft. the Bey ascribes the strata to the lias formation, but not with sufficient and satisfactory organic evidence.—T. J. N.

same as above,—with nodules of iron pyrites; and six inches of blackish, compact, grey calcareous stone bring us down to the depth of 169½ ft. from the surface.

A bed of psammitic, quartzose, compact, grey sandstone with slaty fracture, containing small blackish fragments of shells, indeterminable, as if steeped in bitumen, continues down to the depth of 177 ft. Two feet of an argillaceous sandstone, reticulated with veins of lamellary selenite; and three feet of argillaceous schists,—smoke-coloured and dark yellow, bring us down to the depth of 182 ft.

After these we have two feet of a marly, slaty, grey-coloured clay with green spots having metallic lustrous surfaces;—one foot of the same, but of a dark colour without spots, and traversed by a parallel bed of dolomite—ten inches thick, white, compact, and containing some bivalves of very old date and the teeth of the fish—*squallus*;—two feet of an argillo-quartzose psammite of a greyish colour; layers of a black slaty marl—slightly sandy extend down to 190 ft. below the surface. It contains carbonized plants and their impressions in great number, (monocotyledons).

Three feet of quartzose white psammites; two feet of a bronze green clay;—one foot of a green marl with red spots and of a metallic splendour,—and with carbonized monocotyledons, and their impressions;—one foot of greenish yellow psammite also with monocotyledons;—two feet of black bituminous marl, containing many carbonized, monocotyledonous plants;—one foot of white, argillaceous psammite;—one foot of a black slaty clay, containing lignite infiltrated with iron pyrites;—a foot of black slate with impressions of plants, iron pyrites, and traces of carbonate of copper;—an inch layer of grey dolomite with minute, unknown fossil shells;—one foot of black marl with red spots containing nodular iron pyrites;—six inches of whitish grey, and very compact dolomite with veins of crystallized barytes, and here and there, nests of lignite.

One foot psammitic grit,—with small grains of chlorite;—one foot of black slaty clay, with great numbers of small unknown shells;—two feet of black, slaty clay,—two feet of quartzose psammite of a greenish grey colour;—three feet of white, compact, quartzose psammite;—one foot of black clay, with vegetable impressions;—one foot of violet-coloured marl with green spots;—one foot of a greyish dolomitic

limestone ;—one foot of marl, with pistachio green spots ;—one foot of white psammitic sandstone ;—one foot of black clay with impressions, and bituminized plants ;—four feet of schistose black clay, with impressions, and large nodules, or cakes, of argillaceous dolomite of a grey colour ;—one foot of green psammite with bivalves, belonging to the genus *terebratula (?)*

The foregoing beds carry us down to about 223 ft. below the surface.

To them succeed grey clays with impressions, alternating with layers of a friable dolomite, in which small nodules of galena are perceptible ; —one foot of a compact, grey limestone resembling muschelkalk ;—two feet of very fine-grained psammite ;—three feet of a schistose black clay with impressions of plants which descend down to 236 ft. being divided by pure, fine, greyish tablets of clay.

One foot of black, bituminous slate,—with impressions much carbonized, covers a bed of lignite coal one foot thick, formed of the large stems of Palm, of the genus *Cicas*, of furze, and other plants in confused masses.

The whole of this vegetable matter is impregnated with iron pyrites : under it lies one foot of clay slate similar to that which covers it ;—two feet of argillaceous blackish grey slate—containing few impressions, and large nodules of iron pyrites in groups ;—two feet of grey, argillaceous psammite.

A sandy, grey, slaty clay, containing large cakes of a yellowish spongy dolomite, in which are seen small globules of galena, and pyritous iron, extend down to 259½ ft., when there is an undulating series of depositions of a very black, splendid, compact, bituminous lignite devoid of pyrites—leaving ashes of a greyish white colour after combustion. Below it is a white, compact psammitic sandstone, in which the shaft terminates.

The total depth of the excavation, calculating from the surface of the alluvium, is 270 feet.

The depth of the inclined plane, ...	24 Feet.
2nd stage in the shaft, ...	81
3rd do. do., ...	75
4th do. do., ...	75
5th do. do. lined with wood-work, ...	15
Total depth,	270 feet.

Second excavation in *Wádi Araba.*

The second excavation is at the mouth of the *Wádi Aschar el Bahrieh*, and is 164 ft. deep. The sinking of the pit was commenced at the foot of a range of low sandstone hills, the elevation of which was about 60 ft. above the surface of the *Wádi*. The rate of sinking is about a foot per diem. The strata cut through are as follow:

		Feet.	Inches.
1	Beds of an hydrous plaster (castainite) traversed longitudinally by layers of Sal gemme, each about from 1 to 3 inches thick. It is a pulverulent light sulphate of lime, and of a perfect whiteness.....	3	,,
2	Bed, silicious sandstone—containing masses of white sandstone.....	90	,,
3	Coloured marls *(marnes irisées)*.....	20	,,
4	Variegated red sandstones *(grés rouges big arés)*, with their layers of red ferruginous marls.....	51	,,
	Total feet	164	,,

Examination and analysis of an orange yellow Earth brought from the Sikkim Territory, by Dr. Campbell, Darjeeling, and said to be used there as a cure for Goitre.—*By* Henry Piddington, *Esq. Curator, Museum Economic Geology.*

This earth is apparently nothing but what is usually termed a common yellow-ochery soil, i. e. a soil in which the iron (generally the colouring principle of soils), is mostly in the state of the hydrated carbonate of the protoxide, as so often found in its earthy and nodular ores. Properly it should be described as an orange-coloured soil.

But as it is said to be used in the cure of the unsightly disease Goitre, though with what success or how administered we are not told, it becomes of interest to know if it contains any thing beyond the usual constituents of the poor yellow ferruginous soils, as also what is the proportion of the hydrated carbonate of iron, which one supposes *a priori* to be the active principle.

For I am not aware that, hitherto, the yellow-ochre which is the purest form of the hydrated carbonate, (the officinal preparation being always

partly in the state of the red peroxide,) has been used in modern medicine. The well known Boles of the old Pharmacopæas seem from the description to be both yellow and red ochres, the last either natural or artificial, and they were probably prepared from the yellow-ochres by calcination.

I find the Sikkim soil to contain in 100 parts

Hygrometric water,	5.00
Water and carbonic acid,	0.75
Iron as peroxide,	19.80
Residuum of Silex and Alumina,	74.45
	100.00

The specimen contained no lime or Magnesia and the Silica and Alumina were certainly not the active ingredients?

I examined, as a comparison, a very pure and bright yellow-ochre from Chota Nagpore in the museum. I find it to contain in 100 parts

Hygrometric water,	2.75
Carbonic acid and water of combination,	6.75
Iron as peroxide,	45.35
Residuum of Silex and Alumina,	45.15
	100.00

The difference then between the two is, that the Sikkim earth contains a very little peroxide, from which the red tinge of its orange colour is derived, and about one half the hydrated carbonate which the yellow-ochre does. Its silica too is partly in small fragments which we can scarcely suppose an advantage. But there is a very remarkable property in the iron of the yellow-ochre, and of our Sikkim soil, which the usual officinal carbonate of the shops does not possess, and this may be the key to its efficiency as a curative agent. It is this—

It was long ago pointed out by Mr. Phillips, in his analysis of the Bath waters, that the Iron, which they are found to contain when a large quantity of the water is evaporated, is not demonstrable by any usual test; not even by the Tincture of Galls; but that when a portion of lime water was added to the Assay the Tincture of Galls would then, and then only, produce the usual purple tinge. He assumes thence that the iron exists in some peculiar state. I have also found this in one of our Indian, or rather an ultra Gangetic, mineral water

near Moulmein,* and I have also detected iron in this peculiar state in a common, but highly efficacious preparation, the decoction of Chiretta, which if administered with regularity with a little of the Elixir of Vitriol added to it, is almost of sovereign efficacy against those enlargements of the spleen, which both in Natives and Europeans so constantly follow or accompany intermittent fevers, especially in children.

Now when a portion of the Sikkim soil is agitated with water, and being allowed to stand for 24 hours is tested by Tincture of Galls, nothing is shewn; but upon adding lime water, the purple or rather greenish black tinge forthwith appears. The same takes place with yellow-ochre, but upon trying it with the officinal carbonate of iron it is not produced. My specimen of this last was not freshly prepared, so that this is not quite a certain result; but it must be also very rarely furnished in the fresh state from the shops. The physicians must now, if yellow-ochre be not too insignificant a remedy, pursue Dr. Campbell's discovery with this commentary, the part of the chemist closing here.

On CALDERITE, *an undescribed Siliceo-Iron-and-Manganese Rock, from the district of Burdwan. By* HENRY PIDDINGTON, *Curator Museum Economic Geology.*

I had found and put by for examination a specimen of this rock, which I at first took to be simply an ore of Iron and Manganese, from one of our old collections; being the series from the Ramghur district, (presented, *I think*, by the Rev. Mr. Everest?) this specimen being from Kut-Kumsandy 12 miles N. W. of Hazareebagh. Dr. McClelland, who had also been struck by its appearance, brought me a specimen from the collections of the Survey. I also found several in the late Mr. William's iron ores, one being a very fine block from Burdwan† in which district it seems not to be uncommon. I shall presently state why I have styled it a rock and not an ore.

* Examination and analysis of a mineral water from the Athan Hills in the Tenasserim Provinces. Gleanings of Science for 1831, Vol. III. p. 25 :—read before the Physical Class, As. Soc.

† Proceedings, Nov. 1848.

Description.

This rock can be in no way so well described as by saying, at once, that while on the weathered surfaces it resembles a common massive ore of iron, its appearance on the fresh fracture is exactly that of black rosin. When examined by the magnifier it is seen to have a golden resinous (which is a yellow quartzy) coating, in thin laminæ, especially on some of the fractures. On others it has small specks which are seen by the magnifier to be minute cavities full of a yellow powder.

The fracture is difficult to describe, being in some places hackly, in others tending to small conchoidal, and in some instances breaking on a large scale into an obliquely rhomboidal cavity, as if the rock would cleave naturally into oblique rhomboidal prisms, or contained crystals of that shape. The most perfect cavity I could measure, for I could not obtain a good solid angle, was one of 124°, giving therefore 56° for the acute angle of the rhomboidal crystal.

The splinters are often nearly laminar and sometimes highly translucent like dark brown rosin. When held to the light, these are seen to contain, here and there, fragments of bright white quartz.

The streak is ash-coloured, and obtained only with the file, or on a salient edge by the knife. It is brittle and easily fractured with a moderate blow. The powder is fawn-coloured.

When breathed upon it gives a metallic odour.

The latter portions are tough and difficult to pulverise, requiring repeated sifting and hard pounding.

Its hardness is 7-8. The specific gravity 3.65.

The solid mineral does not alter by digestion in acids, and even in Nitro Hydrochloric Acid; Hydrochloric Acid dissolves a little iron, but in very small proportion (probably from dust) even from extremely thin pieces.

Before the Blowpipe.

It fuses in thin fragments at the edges into a black, dull, pitchy, slag, which is magnetic, the siliceous part remaining in the slag.

With borax the powder fuses immediately into a dark green glass.

With soda and saltpetre upon platina foil, it gives the usual green mass of manganate of soda.

Via Humida.

From the solution in hydrochloric acid, which acts readily on the pulverised mineral, a strong arsenical odour is evolved, but both from this and from the nitro-hydrochloric solution only traces of arsenic can be obtained, amounting at most to 0.15 or 0.20 per cent. The siliceous residuum is remarkably tenacious, adhering strongly to the bottom of the capsule, unless frequently stirred, and even then leaving a thin coating, only to be removed by caustic Potass, and slightly corroding the glass.

The constituent parts of a fair average of the mineral I find to be—

		Or per centage if of manganese and iron only.
Silex, ...	46.35	
Alumina,.....	0.35	
Lime,.....	1.00	
Arsenic, ...	0.20	
Perox.-Iron, ...	30.18	58.64
Protox. Manganese, ...	21.00	41.36
	99.08	100.00
Loss, partly fluorine, of which there are traces, ...	.92	
	100.00	

The most compact and apparently homogeneous specimens of this rock are distinctly seen upon closer inspection to be mere aggregates of a black (or very dark greenish black) mineral, and transparent granules and fragments of quartz, in addition to the golden resinous coating mentioned before. Now if the constituent parts of any specimen can be *seen*, the specimen is then clearly a rock and not a mineral; and I have therefore classed this new specimen as a rock without reference to the abundance or scarcity of it. It is evident also that we must set aside all rules of nomenclature to call it a silicate of iron and manganese for the amount of silica will probably differ in every analysis, and we know not if the greenish black part contains any or how much silica in its composition, and that it may be a simple compound of the oxides only.

I have then considered that, as we are certainly entitled to name it, no name can be more justly bestowed upon it than one in honour of a much lamented member of the Asiatic Society of Bengal, the late Mr. James Calder, whose early views of the Geology of India* are still quoted with high and deserved approbation, whose collections and specimens form a valuable part of our Museum and whose constant zeal for, and encouragement to the pursuit of, Mineralogy and Geology, as well as all other branches of science, many will yet remember as well as myself. I have therefore named it CALDERITE.

* Asiatic Researches, Vol. XVIII. p. 1.

PROCEEDINGS

OF THE

ASIATIC SOICETY OF BENGAL

FOR JANUARY, 1850.

At a meeting of the Society held on the 2nd inst.

The Hon'ble the President, in the chair,

The proceedings of the last meeting were read and confirmed.

The following gentlemen, having been duly proposed and seconded at the December meeting, were balloted for and elected members.

J. J. Gray, Esq. Malda.

J. C. Marshman, Esq. Serampore.

Letters were read—

From W. Grey, Esq., Under Secretary to the Government of India, transmitting a letter from Dr. Impey, regarding a Colossal rock image in the Satpoorah range, with report, drawings and inscriptions.

From Dr. Buist, presenting a copy of his work entitled, the Annals of India, for 1848.

From Mr. Mansel, Serampore, inviting the attention of the Society to the preparation of models, &c. for the Grand Exhibition of arts in London, in 1851.

From Mr. Hodgson, Darjiling, on the Aborigines of the Eastern Frontier.

From Major Wyllie, Officiating Secretary to Government of India, Military Department, transmitting a copy (in two vols.) of Colonel Everest's measurement of the meridional arc of India, received from the Hon'ble the Court of Directors.

From Messrs. R. and J. E. Taylor, London, forwarding a table of meteorological observations inserted at p. 33 of the Transactions of Sections, in the 18th Report of the British Association.

From Captain Champneys, intimating his desire to withdraw from the Society.

From Dr. Campbell, Darjiling, dated Laehong, Oct. 24th, presenting 3 skins of the Kiang or wild Ass of Thibet.

From John Russell Bartlett, Esq., Corresponding Secretary of the American Ethnological Society, dated New York, 15th May, 1849, transmitting, for acceptance of the Society, a copy of the Transactions of the Ethnological Society, (1st and 2nd vols.) and expressing a desire for an exchange of publications.

From Captain Hutton, forwarding some remarks on the snow line of the Himalaya, in reply to Lieut. Strachey.

The annual accounts were submitted and referred to the Finance Committee about to be elected.

The President read the following Report by the Council of the Society, on the state of its affairs at the close of the year 1849.

Report.

The Council regret to state that under the circumstances in which they are placed, they cannot lay before the Society that detailed Report which has usually been presented, and which the Society has a right to expect will be presented, at its annual meeting.

The Senior Secretary Dr. O'Shaughnessy has, during the greater part of the present year, been compelled by the state of his health to absent himself from the Presidency, the same cause also for several months deprived the Society of the services of the Co-Secretary Mr. Laidlay. During the absence of Mr. Laidlay Dr. Walker and Dr. McClelland were kind enough to discharge temporarily the duties of the Secretaries including the editorship of the Journal.

The financial state of the Society was brought to its notice and certain reductions recommended by the Council, in a Report made at the general meeting of the 1st of August, 1849. Some of the recommendations of the Council were adopted and others rejected by a general meeting of the Society held on the 5th of September, 1849.

The Council would have again submitted a more formal statement of the Society's finances, had it not been prevented by the circumstances into which it is now necessary to enter, from drawing up and presenting an annual Report in the ordinary form.

Mr. Laidlay, about the time at which he would naturally have prepared such a Report, was obliged suddenly on pressing private business, to go into the Mofussil, where he has since been detained. The Senior Secretary, owing to his absence from Calcutta and his imperfect acquaintance with the affairs of the Society during many months of the past year, the pressure of public duties, and other causes, has found himself unable to supply the place of his Co-Secretary and to draft such a Report.

The Council have further, and to their great regret, to inform the Society that Dr. O'Shaughnessy finds it impossible to continue to the Society those services from which it has for several years derived so much benefit. The Council has too much reason to apprehend that the Society may also lose the valuable services of Mr. Laidlay, who, as well as Dr. O'Shaughnessy, with every desire for the welfare of the Society, finds that the management of its affairs demands far more time and attention than he has to devote to them.

The Council would, under any circumstances, have considered the retirement of either gentleman, a matter to be regretted by the Society. It is doubly so when the Council is unable to point to any gentleman who is willing, as well as able, to succeed to the onerous office about to be relinquished.

The Council is decidedly of opinion that unless a considerable modification of the duties of the Secretaries takes place—unless their labours be materially lightened, it is unreasonable to expect that any gentleman will undertake an office which, as at present constituted, is both laborious and purely gratuitous, or recompensed only by occasional and considerable annoyances. The editorship of the Journal alone involves an amount of care and attention, which few men engaged in the active business of life can bestow.

The most obvious mode of lightening the labours of the Principal and Honorary Secretaries is by the agency of a paid officer or Under-Secretary, who would save them from mere duties of routine.

Unfortunately the state of the Society's finances renders it impossible to adopt such a measure, except upon the most mature consideration, and with some modification of the existing establishment.

Another measure which deserves immediate attention is the revisal of the rules of the Society. At the annual meeting of January, 1848,

Dr. Walker, with reference to the rules of the Society, read the following proposals:—

1st. "That no alteration in the rules, nor any extraordinary expense beyond (say) 500 Rupees, be sanctioned, except at the annual meeting of the Society; and that before any such questions are finally decided, the Mofussil members, as well as those residing in Calcutta, be called to vote on the same.

"Before this proposition be carried into effect, it is desirable that the rules of the Society should be made as perfect and complete as possible, and that during the interval between each annual meeting, the functions of the Society be solely administrative, it is therefore proposed:—

2nd. "That the Council of the Society be appointed to revise the rules, and that these be carefully compared with the rules of similar institutions in Europe, and that copies of the latter, if they are not already in the library, be immediately sent for overland." H. W.

"After a short discussion, Dr. Walker's proposition, supported by Dr. O'Shaughnessy, was referred for consideration to the Council, who were requested to act upon the 2d para. thereof, at their earliest convenience."

The Council, in the Annual Report for the year 1848, mentioned that they had caused letters to be written to Europe requesting to have copies of the rules of other learned and scientific Societies, but that the answers to those letters had not been received.

No answers to those letters have now been received, but the Council believe that there exist in Calcutta, including the excellent rules which have lately been framed and submitted to the Agricultural Society for its adoption, ample materials for the revisal of this Society's rules—and that the revision of them should no longer be delayed.

The Council however have not thought fit to take up this subject at present, because they could not have completed the task before the period which has now arrived, of the annual election of officers, when they themselves are functione officii.

The Council cannot disguise from themselves that the present state of the Society is most unsatisfactory, especially in regard to the most important of the Society's officers, that of Secretary—and to the absence of a detailed report on the Society's affairs.

They are happy to state, however, that if no fit successors can now be found, Dr. O'Shaughnessy (and they believe Mr. Laidlay also) is willing, if re-elected, to discharge the current duties of Secretary temporarily and until a new arrangement can be made. Upon Mr. Laidlay's return moreover the deficiencies in the present report may be supplied, and an extraordinary report may be made.

The following are the resolutions which, in this difficult conjuncture, the Council would recommend for the adoption of the Society.

1st. That the Council now to be elected, be requested to proceed without delay to revise the rules of the Society, and that it do also take into its immediate consideration the state of the Society and report thereon.

2ndly. That the rules when revised be printed and circulated amongst the members, including those resident in the Mofussil, and that the Mofussil members be requested to vote on the question of the adoption or rejection of such rules, sending their votes in writing to the Secretary.

3rdly. That the rules be discussed at a special general meeting, and the votes of the members, including those of the Mofussil members, ascertained as above, be taken thereon.

The Council cannot suppose that any doubt can exist of the propriety of allowing the Mofussil members an opportunity of expressing their opinions upon questions so materially affecting the Society and its organisation.

4thly. That in addition to the ordinary officers, the Society do elect a Finance Committee of three persons, pursuant to the recommendation to that effect contained in the report of the 1st of August, 1849.

The above report was unanimously adopted.

The meeting then proceeded to elect office-bearers for the ensuing year.

Lt.-Col. Forbes having signified his desire to be permitted to retire from the list of Vice-Presidents,

It was proposed by Mr. J. R. Colvin and seconded by Capt. Broome, that as a testimony of the great respect of the Society, Col. Forbes be at the next meeting elected an Honorary Vice-President of the Society, as was done on the retirement of Mr. Torrens.

The election of officers then took place when the following gentlemen were chosen :—

President.

HONORABLE SIR JAMES W. COLVILE, KT.

Vice-Presidents.

THE RT. REV. DANIEL WILSON, *Bishop of Calcutta.*
J. W. LAIDLAY, ESQ.
W. B. O'SHAUGHNESSY, ESQ. M. D.
WELBY JACKSON, ESQ.

Council.

CAPT. A. BROOME.
BABU RAMGOPAL GHOSE.
DR. H. WALKER.
DR. J. MCCLELLAND.
S. G. T. HEATLY, ESQ.
W. SETON KARR, ESQ.
J. R. COLVIN, ESQ.
C. BEADON, ESQ.
R. W. G. FRITH, ESQ.

Secretaries.

DR. W. B. O'SHAUGHNESSY.
J. W. LAIDLAY, ESQ.
DR. E. ROER, *Secretary in the Oriental Department.*

Sections.

Oriental Section.

W. SETON KARR, ESQ.
W. JACKSON, ESQ.
BABU HARIMOHAN SEN.
BABU RAJENDRALAL MITTRA.
REV. J. LONG.
DR. ROER, *Secretary.*

Natural History.

J. W. GRANT, ESQ.
DR. H. WALKER.
R. W. G. FRITH, ESQ.
DR. MCCLELLAND.
DR. MACRAE.
J. W. LAIDLAY, ESQ. *Secretary.*

Statistical.

REV. J. LONG.
LIEUT. N. A. STAPLES.
DR. DUNCAN STEWART.
C. BEADON, ESQ.

Geology and Mineralogy.

CAPT. BROOME. | JAS. DODD, ESQ. | A. MITCHELL, ESQ.

Physics and Meteorology.

J. W. Grant, Esq. | Lieut.-Col. W. N. Forbes.
Capt. W. H. L. Thuillier. | Venerable J. H. Pratt.
J. Newmarch, Esq.

Finance Committee.

C. Beadon, Esq. | S. G. T. Heatly, Esq. | J. R. Colvin, Esq.

The Curator of the Museum of Economic Geology submitted an apology for non-attendance on the grounds of indisposition.

The Librarian having handed in his usual monthly report, the meeting adjourned.

Confirmed, J. W. Colvile.

Library.

The following books have been received since the last meeting.

Presented.

Icones Plantarum Asiaticarum, Part II.: On the higher Cryptogamous Plants. By the late W. Griffith, Esq. Calcutta, 1849, 4to., 2 copies.—Presented by the Government of Bengal.

Notulæ ad Plantas Asiaticas, Part II.: On the higher Cryptogamous Plants. By the late W. Griffith, Esq. Calcutta, 1849, 8vo., 2 copies.—By the Same.

Itinerary Notes of Plants collected in the Khasyah and Butan mountains, 1837-38, in Affghanistan and neighbouring countries, 1839 @ 1841. By the late W. Griffith, Esq. Calcutta, 1849, 8vo., 2 copies.—By the Same.

Annals of India for the year 1848. An outline of the principal events which have occurred in the British dominions in India from 1st January, 1848, to the end of the second Sikh War in March, 1849. By G. Buist, L. L. D. Bombay, 1849, 8vo.—By the Author.

The English and Native Calendars for 1850. Bombay, 1850.—By the Editor.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of November, 1849.—By the Deputy Surveyor General.

Tattvabodhiní Patriká, No. 76.—By the Tattvabodhini Sabha.

The Oriental Christian Spectator, Nos. 11, 12.—By the Editors.

Journal of the Indian Archipelago for Oct. 1849.—By the Editor.

Two copies of the same.—By the Government of Bengal.

Calcutta Christian Observer, No. 212.—By the Editors.
Oriental Baptist, No. 37.—By the Editor.
Upadeshaka, No. 37.—By the Editor.

Exchanged.

The Athenæum, Nos. 1143-46.

Purchased.

Comptes Rendus, Nos. 7-14.
Journal des Savans for August and September, 1849.
The Annals and Magazine of Natural History for Oct. 1849.
The Edinburgh Review, No. 189.

Report of the Curator, Museum of Economic Geology for the month of January.

Economic Geology.

I have taken advantage in the course of my correspondence on storm matters with H. E. the late Naval Commander-in-chief, to request the favour of specimens of coal and coal strata from Laboan, and of any other specimens which could be obtained for the Museum; and we have now received from Captain Wallage of H. C. Steamer Nemesis, the following note with a box of specimens and the sketch therein alluded to.

Dear Sir,—A short time ago I received an order to make a collection of strata, &c. from Laboan for the Museum of Economic Geology of India.

I have now the pleasure of sending per Brig "Poppy" some specimens from the north end of Laboan and adjacent islands, and a sketch of the section of the same.

Your's very truly,
(Signed)—Wallage, *Commr.*
H. C. Steamer Nemesis.

Sincapore, July 9th, 1849.

The coal from Laboan I have analysed; it is of a very fine description, and in fact equal to the average of English coal, as given in Mr. Prinsep's table; Journal A. S., Vol. VII. p. 199.

		English Coal.
Its Sp. Gravity is, ...	1.27	1.296
Its constituent parts are		
Gaseous and Volatile matter, ...	36.50	31.00
Carbon, ...	61.35	67.30
Ash, ...	2.15	2.8
	100.00	100.38

We received from Captain Phayre, some time back, three specimens of ores from Moulmein which having laid by I forgot, but have now examined. They are two of common galena and one of specular iron; but none of them of any value, nor do they contain any trace of silver.

From H. Torrens, Esq. C. S. Agent G. G. at Moorshedabad, we have received a specimen of the iron manufactured by the Sontals of Birbhoom, with a valuable note on it well worthy of insertion in the Journal.

Mr. Humfray has obliged us by allowing me to select from a large heap of the ball coal of Burdwan at his yard such specimens as I pleased, and he has also presented several highly curious ones selected by himself. Mr. Theobold, Junior has also sent us a good basket full of specimens so that we are now enabled to pronounce with certainty that this curious variety really is, as I suspected in my second notice, coal which has been softened by heat under pressure and has, like trap and other rocks under similar conditions, assumed a pseudo-columnar, and at times a globular, form in cooling.

We have now by Mr. Homfray's and Mr. Theobold's liberality a whole case of highly valuable and interesting specimens. I have put into a separate paper for the Journal my detailed examination of this coal.

Geological and Mineralogical.

Captain W. S. Sherwill has brought us from the Cape a complete set of specimens of the Table mountain with several ores and other miscellaneous specimens, many of which will be useful in completing series or filling up blanks.

Messrs. J. H. Duncan and W. H. M. Sweetland have presented a miscellaneous collection of specimens procured during a Geological survey of the Kurruckpore and Rajmahal hills, many of which I anticipate will be of interest.

Dr. *Abstract Statement of Receipts and*

RECEIPTS.

To Museum.

Received from the General Treasury the amount of allowance authorized by the Court of Directors for the services of a Curator from December 1848 to November 1849, at 250 Rs. per mensem, .. Rs.	3,000	0	0			
Ditto ditto for the preparation of Specimens of Natural History from ditto to ditto, at 50 Rs. ditto,..	600	0	0			
Ditto back amount of Gulu and Hari Ferashes' salaries, their services not having been entertained, ..	32	13	3			
				3,632	13	3

To Museum of Economic Geology.

Received from the General Treasury the amount of allowance authorized by Government for the services of a Joint Curator from December 1848 to November 1849, at 250 Rs. per mensem, ...	3,000	0	0			
Ditto ditto for Establishment and contingencies, at 64 Rs. per mensem, ...	768	0	0			
Received fines from Punka boy's and Peon's salaries,	0	8	3			
				3,768	8	3
Carried over,..				7,401	5	6

Disbursements of the Asiatic Society for the year 1849. Cr.

DISBURSEMENTS.

By Museum.

Paid Mr. E. Blyth's Salary as Curator from December 1848 to November 1849, being 12 months, at 250 Rs. per mensem, ... Rs.	3,000	0	0					
Ditto ditto house-rent from ditto to ditto being 12 months, at 40 Rs. per mensem, ...	480	0	0					
				3,480	0	0		
Ditto Establishment of Taxidermists, Artists, Carpenters, &c. from December 1848 to February 1849, at 147 Rs. per ditto, ...	441	0	0					
Ditto ditto for March and April, at 137 Rs. ditto, ...	274	0	0					
Ditto ditto from May to September, at 124 Rs. ditto, ...	620	0	0					
Ditto ditto for October and November, at 82 Rs. ditto, ...	164	0	0					
				1,499	0	0		
Ditto for Contingencies incurred for the preparation of Specimens of Natural History, ...				436	1	0		
Ditto Tarachund Doss for 4 mats for the Bird room...				54	2	0		
Ditto postage for a parcel containing Shells received from Europe,..				5	0	0		
Ditto for Casks and cooly hire for spirits of wine, ..				3	14	0		
Ditto Bissonauth Mistry for supplying 100 Teak-wood tickets for the shells, ...				3	0	0		
Ditto Auhin China-Carpenter for making 4 Glass Cases, ...	335	0	0					
Ditto Issore Chunder Carpenter for 3 ditto, ...	150	0	0					
				485	0	0		
Ditto charges for landing 3 cases containing Specimens of Natural History,..				1	5	0		
Ditto Messrs. W. Thacker and Co. for 19 sheets of tinted paper, ...				7	2	0		
							5,974	8 0

By Museum of Economic Geology.

Paid Mr. H. Piddington's Salary as Joint-Curator from December 1848 to November 1849, being 12 months, at 250 Rs. per mensem, ...				3,000	0	0		
Ditto Establishment from Dec. 1848 to Sept. 1849, being 10 months, at 31 Rs. per mensem, ...	310	0	0					
Ditto ditio for Oct. and Nov. ..	67	14	0					
				377	14	0		
Ditto for Contingencies, ...				109	3	3		
Ditto Messrs. Scott and Co. for a copy of Bengal Directory for the year 1849,..				8	0	0		
Carried over,...				3,495	1	3	5,974	8 0

				Brought forward, Co.'s Rs.	7,401	5 6

To Oriental Publication Fund.

Received from the General Treasury the amount of Government grant, towards the publication of Oriental Works from December 1848 to June 1849, being 7 months, at 500 Rs. per mensem, ..	*3,500	0	0			
Received from the separate account of the O. P. Fund, being the amount in full of the balance due to the General Funds of the Society, ...	119	8	9			
					3,619	8 9
				Carried over,..	11,020	14 3

* See N. B. in next page.

Brought forward, Co.'s Rs.	3,495	1	3	5,974	8	0
Paid Curreem Duftery for pasting a Map of Behar with cloth, ...	13	0	0			
Ditto for 1 dozen Stoppered bottles, ...	3	0	0			
Ditto for Toon-wood Writing Table, ...	32	0	0			
Ditto for 1 ounce of Caustic Soda in a stone vial, ..	9	0	0			
Ditto for a Platina Capsule,..	12	0	0			
Ditto for a Woollaston's reflecting Gnomiometer, ..	50	0	0			
Ditto for a Copy of Memoir of the Museum of Economic Geology of London, ...	12	8	0			
Ditto for 2 Vols. of Hellot des Mines, ...	12	0	0			
				3,638	9	3
By Museum of Mineralogy and Geology.						
Paid Mr. H. Piddington Curator, for Sundry Contingencies, ...	109	14	9			
				109	14	9
By Oriental Publication Fund.						
Paid Dr. E. Roer's salary as Editor of the Oriental Journal from December 1848 to June 1849, being 7 months, at 100 Rs. per mensem,*	700	0	0			
Ditto Establishment from ditto to ditto,.. ..	326	0	0			
Ditto Contingencies ditto ditto, ...	50	9	9			
Ditto for a remittance to Dr. Ballentyne, for copying the Yajur Veda, ...	50	0	0			
Ditto Rev. J. Thomas, on account Baptist Mission Press, for printing and paper for 500 copies of the Bibliotheca Indica, No. 9 to 12 or from September to December 1848, ...	888	0	0			
Ditto freight, packing charges, &c.	18	1	0			
Paid Establishment for the custody of Oriental Works from December 1848 to June 1849, being 7 months, at 72 Rs. per mensem, ...	504	0	0			
Ditto Contingencies for ditto, ...	9	10	6			
Ditto Jas. Corcoran, Esq. for 20 copies of his account Geographical, Historical and Statistical of the Chinese Empire, in the Urdu language, at 8 Rs. each,	160	0	0			
Ditto Messrs. Lattey, Brothers and Co. for a MS. copy of History of Sooltan Aboo Syad, ..	33	0	0			
Ditto Mudan Mohun Turkalankar for Sundry Sanskrit books, ...	27	8	0			
Ditto Duftery for binding books, ...	29	0	0			
Ditto into the Bank of Bengal on separate Account of the Oriental Publication Fund, ...	2,200	0	0			
				4,995	13	3
Paid Rev. J. Thomas, on account Baptist Mission Press for printing and paper for 500 copies of the Bibliotheca Indica, No. 5 to 8, ...	870	8	0			
				*870	8	0
Carried over,..				15,589	5	3

* This amount has been debited in the separate Account of Oriental Publication Fund on the 30th December 1848.

N. B. The Receipts and Disbursements on account of the Oriental Fund subsequent to the 30th June 1849, are not included in the General Account, separate accounts being kept for the same.

			Brought forward, Co.'s Rs.	11,020	14 3
To Library.					
Received by sale of Miscellaneous Books,		..	22 11 3		
				22	11 3

To Sale of Oriental Publications.					
Received by sale of Oriental Works sold at the Library, and Subscriptions to the "Bibliotheca Indica,"	994	8	0		
Received proceeds of Oriental Works sold at Benares,	293	0	0		
				1,287	8 0
Carried over,..				12,331	1 6

					Brought forward, Co.'s Rs.		15,589	5 3
By Library.								
Paid Babu Rajendra Lal Mittra's salary as Assistant Secretary and Librarian, from December 1848 to September 1849, being 10 months at 100 Rs. per mensem, ...	1000	0	0					
Ditto—Ditto—for October and November 1849, at *70 Rs. per mensem,..	140	0	0					
				1,140	0	0		
Ditto Establishment from December 1848 to September 1849, being 10 months at Rs. 58-8-0 per mensem,..	585	0	0					
Ditto—Ditto—for October and November 1849, at Rs. 37-8-0—ditto, ..	75	0	0					
				660	0	0		
Ditto contingencies from December 1848 to November 1849, ...				62	4	0		
Ditto Messrs. R. C. Lepage and Co. for purchase of books, ..	333	8	0					
Ditto—Ditto—for landing charges for books, parcels, &c., ...	5	6	0					
				338	14	0		
Ditto Messrs. W. Thacker and Co. for purchase of books, ...				124	8	0		
Ditto Busseerudee Bookseller for ditto, ..				13	12	0		
Ditto for sundry books purchased for the purpose of presenting to Mr. Konig, as per Librarian's Account,				195	*0	0		
Paid Messrs. Stewart, Ford and Co. per order of Messrs. Smith, Elder and Co. London, for 3 copies of parts 7 to 9, Falconer and Cautley's, Fauna Antiqua Sivalensis subscribed for by the Society £10-10, Ex. at 1s. 9½d. per Rupee, ...	117	3	0					
Ditto landing charges, ...	2	0	0					
				119	3	0		
Ditto Duftery for binding books, ...				206	10	0		
Ditto Mr. G. T. Lackersteen for 6 wrought iron suspenders with screws, &c., ...	18	12	3					
Ditto Bissonauth Mistry for ditto and Teak-wood planks, ...	46	8	0					
				65	4	3		
Ditto Ramchand Mistry for a Teak-wood Book-shelf,				25	0	0		
Ditto freight and shipping charges for Sundry books presented to the Geographical Society of Bombay,..				8	5	6		
							2,958	12 9
By Sale of Oriental Publications.								
Paid Mr. R. Stopford Agent G. S. N. Co. freight for despatching Oriental Works for sale to Captain Kittoe, Benares, ...				3	0	0		
							3	0 0
					Carried over,..		18,551	2 0

* The Librarian is allowed 30 Rs. per mensem from the Oriental Fund in addition to the 70 Rs. paid from the General Funds of the Society, agreeably to the resolutions of a General Meeting held on the 5th September 1849.

				Brought forward, Co.'s Rs.	12,331	1	6
To Journal.							
Received by sale of the Society's Journal, ..			113	0	0		
Ditto by transfer from the separate account of Subscription, to the Journal, ...			1,395	0	0		
					1,508	0	0
To Secretary's Office.							
Received from Buckawoolla Peon, 2nd and 3rd instalment in part payment of Rs. 10 advanced him on account of his salary, ...			2	0	0		
					2	0	0
To Miscellaneous.							
Received from B. H. Hodgson, Esq. amount of expenses incurred in printing his Essay on Kooch, Bodo, and Dhimal Tribes,..			650	0	0		
Ditto from the Librarian, proceeds of old durma mats and packing chests sold at the Library, ..			1	8	0		
					651	8	0
				Carried over,..	14,492	9	6

				Brought forward, Co.'s Rs.	18,551	2 0
By Asiatic Researches.						
Paid Mr. W. H. Haycock, Superintendent Bishop's College Press, for printing 500 copies of a portion of the Asiatic Researches and in full of all demands,..				288 0 0		
					288	0 0
By Journal.						
Paid Rev. J. Thomas, on account Baptist Mission Press for printing the Society's Journal from May to September 1848, ...				1,733 0 0		
Ditto Mr. T. Black, Proprietor of the Asiatic Lithographic Press for lithographing plates, &c. ..				599 9 3		
Ditto Mr. J. D'Cruz, for the Proprietors of the Calcutta Lithographic Press for lithographing maps, &c.				192 8 0		
Ditto Mr. H. M. Smith for drawing a map of Nepaul and Bootan on transfer paper, ...				25 0 0		
Ditto Mudoosoodun Doss, Draftsman his salary from 16th March to 30th November 1849, at 15 Rs. per mensem, ...			127 12 0			
Less amount fined, ...			3 0 0			
				124 12 0		
Ditto salaries of Extra Draftsmen, ...				10 5 4		
Ditto freight for Journals forwarded to Messrs. W. H. Allen and Co. London, per P. and O. S. N. Co.'s Steamers, ...				157 8 0		
Ditto contingencies and postages, ...				79 11 0		
					2,922	5 7
By Secretary's Office.						
Paid Mr. F. Greenway's salary as Officiating Accountant from December 1848 to July 1849, at 60 Rs. per mensem, ...				480 0 0		
Ditto Establishment from Ditto to Ditto,			383 2 5			
Ditto—Ditto from September to November 1849, at 42 Rs. per mensem,			126 0 0			
				509 2 5		
Ditto Salaries of extra Peons and Sirkars for collecting bills, ...				25 12 11		
Ditto for Stationary, ...				21 13 0		
Ditto for Account books, ...				19 13 6		
Ditto for printing Circular letters, &c.				9 8 0		
Ditto for contingencies and postages, ...				84 10 3		
					1,150	12 1
By Miscellaneous.						
Paid Mr. F. Halligan's salary as Night Guard from December 1848 to November 1849, at 40 Rs. per mensem, ...				480 0 0		
Ditto Messrs. Tarrachand Doss and Co. for three 6-light bronzed ring Lustres, at 35 Rs. each, ..				105 0 0		
Ditto Messrs. Modoosoodun Doss and Co. for 1½ dozens of oil burners, at 5 Rs. per dozen, ..				7 8 0		
Ditto Messrs. Thompson and Co. for repairing the bottom of hanging Lustres, ...				5 0 0		
Ditto for advertising meeting of the Society in the Newspapers, ...				119 3 0		
Ditto for Sundry contingent expenses for the meeting and oil for Night Guard, ...				109 4 0		
				Carried over,.. 825 15 0	22,912	4 8

Brought forward, Co.'s Rs.			14,492 9 6
To Contributions and Admission Fees.			
Received from Members, amount of quarterly contributions, from January to December, 1849, ..	8,136 0 10		
Ditto ditto in advance, ..	681 14 6		
Ditto ditto by transfer, ..	144 0 0		
		8,961 15 4	
Ditto ditto admission fees, ...		448 0 0	
			9,409 15 4
To Donations.			
Received from J. W. Laidlay, Esq. donation for the use of the Zoological Department, ...		500 0 0	
			500 0 0
To Capt. M. Kittoe.			
Received from him, amount paid on his account as per contra, ...		9 6 3	
			9 6 3
To Hon'ble Sir J. W. Colvile.			
Received from him as loan, ...		700 0 0	
			700 0 0
Carried over,..			25,111 15 1

Brought forward, Co.'s Rs.				825	15	0	22,912 3 8
Paid Ferash's salary for the Reading Room, ..				30	0	0	
Ditto for a patent Letter-safe, ...				40	0	0	
Ditto Mr. J. Chaunce for winding up and keeping the clock in order from May 1848 to April 1849, ..				25	0	0	
Ditto for Sundry expenses incurred for erecting pedestals for Statues and Sculptures, ...				75	1	3	
Ditto Mr. J. Sinclair, Accountant Oriental Bank for a set of Bills of Exchange for £21 in favor of W. Neal, Esq. Collector of Oriental Translation Fund, London, and remitted to him on account of Subscriptions for the years 1847 and 1848, Exchange at 1-9⅛ per Rupee				238	9	3	
Ditto for printing blank receipts and bills, ...			39	14	3		
Ditto Mr. T. Black for printing from a steel engraving 100 copies of an emblematic Vignette of the Museum, ..			6	0	0		
				45	14	3	
Ditto for Sundry contingent expenses, ...				10	4	0	
							1,290 11 9
By Buildings.							
Paid Mr. J. M. Voss, Architect, for repairing the Society's premises, in part of the balance of his account, Rs. 1348-10-3, ...				1,000	0	0	
Ditto for Sundry alterations and petty repairs done to the Society's premises, ...				96	11	9	
							1,096 11 9
By Batavian Society of Arts and Sciences.							
Paid for the following books purchased on account of the above Society.							
A set of Calcutta Christian Observer, ..				33	12	0	
A do. of Calcutta Journal of Natural History, ..				40	0	0	
Freight, ...				8	0	0	
Packing, Chest, &c., ...				0	13	9	
Shipping charges, ...				0	8	0	
							83 1 9
By Captain M. Kittoe.							
Paid for advertising in the Newspapers "Wanted a clever Draftsman,"				9	6	3	
							9 6 3
By B. H. Hodgson, Esq.							
Paid Salaries of extra Dufterys for fixing correction labels on "Mr. Hodgson's Aborigines in India," ..				33	12	0	
							33 12 0
By H. Torrens, Esq.							
Paid him (by transfer) in part payment of Rs. 998, due to him by the Society on the 31st December 1848, ...				64	0	0	
							64 0 0
By J. Muir, Esq.							
Paid him (by transfer) in part payment of Rs. 332, due to him by the Society, ...				64	0	0	
							64 0 0
						Carried over,..	25,553 15 2

Brought forward, Co.'s Rs.	25,111	15	1
To Balance.			
As per Account closed on the 31st of December, 1848, ..	1,072	14	8
Company's Rupees,.. ..	26,184	13	9

Calcutta, Asiatic Society's Rooms,
the 31st December, 1849.

					Brought forward, Co.'s Rs.		25,553	15 2
By J. W. Laidlay, Esq.								
Paid him (by transfer) in part payment of Rs. 475-7-4, due to him by the Society,	..	..			16	0 0		
							16	0 0
By Balance.								
In the Bank of Bengal,	..	..	527	13 5				
Cash in hand,	..	..	14	0 2				
					541	13 7		
By Inefficient Balance.								
For balance of the amount advanced to Mr. Templeton for contingencies in the Museum of Zoology Department for May and June 1849,	..		7	1 0				
For amount advanced Mr. Blyth, for ditto ditto, for November 1849,	..		50	0 0				
For amount advanced Baboo Rajendra-lal Mittra for contingencies in the Library for December 1849,	..		16	0 0				
					73	1 0		
							614	14 7
					Company's Rupees,		26,184	13 9

Errors and Omissions Excepted,
Seebchunder Nundy.

Dr. *The Oriental Publication Fund in*

January 1st, 1849.—To Cash paid Dr. E. Roer, Editor of the Oriental Journal "Bibliotheca Indica," his salary for the month of Dec. 1848, Rs.	100	0	0						
Ditto ditto ditto Establishment for ditto,	46	2	9						
				146	2	9			
Ditto 9th ditto, Librarian for sundry Contingencies in the Library Oriental Department for the month of Nov...	1	13	0						
Ditto ditto ditto for Dec... ..	2	5	0						
Ditto ditto Freight on a parcel of Oriental Works despatched to Capt. Kittoe, Benares, ...	1	0	0						
Ditto ditto ditto ditto, ...	1	8	0						
Ditto 16th ditto, Establishment for the custody of Oriental Works for December, 1848, ...	72	0	0						
				78	10	0			
							224	12	9
February 3rd, ditto, Dr. E. Roer, Editor of the Oriental Journal "Bibliotheca Indica," his salary for January, 1849,	100	0	0						
Ditto ditto ditto Establishment for ditto,	40	0	0						
Ditto ditto ditto Contingencies for ditto,	7	3	6						
				147	3	6			
Ditto 17th, ditto, Establishment for the custody of Oriental Works for January, 1849, ...				72	0	0			
							219	3	6
March 6th, ditto, Dr. E. Roer, Editor of the Oriental Journal "Bibliotheca Indica," his salary for Feb. 1849, ..	100	0	0						
Ditto ditto Establishment for ditto, ..	40	0	0						
Ditto ditto Contingencies for ditto, ..	7	9	6						
				147	9	6			
Ditto 21st, ditto, Establishment for the custody of Oriental Works for Feb. 1849, ...	72	0	0						
Ditto 29th, ditto, Librarian for sundry Contingencies in the Library Oriental Department for Feb. 1849, ..	1	14	0						
Ditto ditto Government Steam Boat Office, freight on a case forwarded to Capt. Kittoe, Benares, ...	12	3	0						
				86	1	0			
							233	10	6
April 7th, ditto, Dr. E. Roer, Editor of the Oriental Journal "Bibliotheca Indica," his salary for March, 1849, ..	100	0	0						
Ditto ditto ditto Establishment for ditto,	40	0	0						
Ditto ditto ditto Contingencies for ditto,	7	1	0						
				147	1	0			
Ditto 14th, ditto, Establishment for the custody of Oriental Works for the month of March, 1849, ..				72	0	0			
							219	1	0
				Carried over,			896	11	9

Account Current with the Asiatic Society. Cr.

January 1st, 1849.—By Balance of Account closed and published down to the 31st Dec. 1848.									
Company's Papers of the new 5 per cent. Loan deposited with the Government Agent, ...	4,000	0	0						
Cash, ...	1,376	4	6						
				5,376	4	6			
							5,376	4	6
Ditto 22nd, By Cash received from the General Treasury the amount of monthly grant sanctioned by the Hon'ble Court of Directors for the month of Dec. 1848, ...				500	0	0			
							500	0	0
February 20th, ditto, ditto for January, 1849, ..				500	0	0			
							500	0	0
March 20th, ditto, ditto for February, 1849, ..				500	0	0			
							500	0	0
April 18th, ditto, ditto for March, 1849,.. ..				500	0	0			
							500	0	0
May 19th, ditto, ditto for April, 1849, ...				500	0	0			
							500	0	0
July 20th, ditto, ditto for May, 1849, ...				500	0	0			
Ditto 21st, ditto, ditto for June, 1849, ...				500	0	0			
							1,000	0	0
August 15th, ditto, ditto for July, 1849,.. ..				500	0	0			
							500	0	0
September 17th, ditto, ditto for August, 1849, ..				500	0	0			
							500	0	0
October 20th, ditto, ditto for September, 1849, ..				500	0	0			
							500	0	0
November 19th, ditto, ditto for October, 1849, ..				500	0	0			
							500	0	0
December 22nd, ditto, ditto for November, 1849, ..				500	0	0			
							500	0	0

Carried over, 11,376 4 6

				Brought forward,			896 11 9
May 7th, 1849, Dr. E. Roer, Editor of the Oriental Journal, his salary for the month of April last, ..	100	0	0				
Ditto ditto ditto Establishment for ditto,	63	0	0				
Ditto ditto ditto Contingencies for ditto,	9	2	6				
Ditto 15th, ditto, amount sent to Dr. Ballentyne for copying the Yajur Veda,	50	0	0				
				222	2	6	
Ditto 8th, ditto, Librarian for sundry contingencies in the Library Oriental Department, for the month of March, 1849, ...	4	2	0				
Ditto ditto ditto, Sorit-ullah Duftery for binding books, ...	19	7	0				
Ditto 15th, ditto, Establishment for the Custody of Oriental books for the month of April, 1849, ...	72	0	0				
Ditto 18th, ditto, J. Corcoran, Esq. for 20 copies of the 1st Volume of his Account Geographical, Historical, Statistical of the Chinese Empire in the Urdu Language, at 8 per copy, ..	160	0	0				
				255	9	0	
							477 11 6
June 9th, ditto, Dr. E. Roer, Editor of the Oriental Journal "Bibliotheca Indica," his salary for May, 1849, ..	100	0	0				
Ditto ditto ditto, Establishment for do.	63	0	0				
Ditto ditto ditto, Contingencies for do.	5	3	0				
				168	3	0	
Ditto 15th, ditto, Establishment for the Custody of Oriental Works for May, 1849, ...	72	0	0				
Ditto ditto ditto, Librarian for sundry Contingencies in the Library Oriental Department for April, 1849, ..	0	8	0				
Ditto ditto ditto, Messrs. Lattey, Brothers and Co. for a copy of History of Sooltan Aboo Syed, ...	33	0	0				
Ditto ditto ditto, Freight on a case of books despatched to Captain Kittoe, Benares, ...	1	8	0				
				107	0	0	
							275 3 0
July 17th, ditto, Establishment for the Custody of Oriental Works for the month of June, ...	72	0	0				
Ditto 18th, ditto, Librarian for Contingencies in the Library Oriental Department for May and June, ..	0	14	6				
Ditto 18th—To Cash paid Muddonmohun Tarkalankara for sundry Sanscrit works purchased from him, ..	27	8	0				
Ditto ditto ditto, Sorit-ullah Duftery for binding books, ...	9	9	0				
				109	15	6	
							Carried over, 1,649 10 3

Brought forward,	11,376	4	6

Carried over,	11,376	4	6

					Brought forward,		1,649	10 3
July 19th, 1849, Dr. E. Roer, Editor of the Oriental Journal, "Bibliotheca Indica" his salary for the month of June, ...	100	0	0					
Ditto ditto ditto, Establishment for Do.	40	0	0					
Ditto ditto ditto, Contingencies for Do.	8	3	6					
				148	3	6		
							258	3 0
Ditto 23d, ditto, Rev. J. Thomas, on account Baptist Mission Press, for printing the "Bibliotheca Indica" from September to December, 1848, No. 9 to 12,..				888	0	0		
							888	0 0
August 1st, ditto, J. W. Laidlay, Esquire, for 100 copies of his version of the "Fa Hian," purchased from him, at 5 Rs. per copy, ...				500	0	0		
							500	0 0
Ditto 9th, ditto, Dr. E. Roer, Editor of the Oriental Journal "Bibliotheca Indica" his salary for July last, ..	100	0	0					
Ditto ditto ditto, Establishment for Do.	55	0	0					
Ditto ditto ditto, Contingencies for Do.	7	1	0					
Ditto 13th ditto, Advanced Dr. E. Roer, on account copying the black Yajur Veda, ...	200	0	0					
				362	1	0		
Ditto 17th ditto, Establishment for the Custody of Oriental works for July,	72	0	0					
Ditto ditto ditto, Librarian for Contingencies in the Library Oriental Department for July last, ..	0	10	0					
				72	10	0		
							434	11 0
Ditto 18th, ditto, Rev. J. Thomas, on account Baptist Mission Press, for printing the "Bibliotheca Indica" from January to April, 1849, No. 13 to 16, ..				892	6	0		
							892	6 0
September 7th, ditto, Dr. E. Roer, Editor of the Oriental Journal "Bibliotheca Indica" his salary for August last, ...	100	0	0					
Ditto ditto ditto, Establishment for Do.	55	0	0					
Ditto ditto ditto, Contingencies for Do.	7	12	0					
				162	12	0		
Ditto 17th—To Cash paid Establishment for the Custody of Oriental works for the month of August,				72	0	0		
							234	12 0
October 23d, ditto, for September, ..	72	0	0					
Ditto ditto ditto, Librarian for contingencies for the months of August and September, ...	1	1	0					
				73	1	0		
Ditto 24th, ditto, Dr. E. Roer, Editor of the Oriental Journal "Bibliotheca Indica," his salary for September, ..	100	0	0					
Ditto ditto Establishment for ditto, ..	55	0	0					
Ditto ditto Contingencies for ditto, ..	11	12	0					
				166	12	0		
							239	13 0
					Carried over,		5,097	7 3

Brought forward, 11,376 4 6

Carried over, 11,376 4 6

					Brought forward,		5,097	7 3
November 16th, 1849, Rev. J. Thomas, on account Baptist Mission Press, for printing the "Bibliotheca Indica," from May to September, 1849, No. 17 to 21, ...					1,233	12 0		
							1,233	12 0
Ditto 17th, ditto, Establishment for the custody of Oriental Works for the month of October, ..					42	0 0		
Ditto 19th, ditto, Dr. E. Roer, Editor of the Oriental Journal "Bibliotheca Indica," his salary for October last,	100	0	0					
Ditto ditto Establishment for ditto, ..	85	0	0					
Ditto ditto Contingencies for ditto, ..	4	6	0					
					189	6 0		
							231	6 0
December 18th, ditto, Dr. E. Roer, Editor of the Oriental Journal "Bibliotheca Indica," his salary for Nov. ..	100	0	0					
Ditto ditto Establishment for ditto, ..	70	0	0					
Ditto ditto Contingencies for ditto, ..	5	3	0					
					175	3 0		
Ditto Establishment for the custody of Oriental Works for November, ..	42	0	0					
Ditto 22nd, ditto, Librarian for Contingencies for the Library Oriental Department for November last, ..	1	2	0					
					43	2 0		
							218	5 0
							6,780	14 3
Dec. 31st.—To Balance—								
Company's Papers of the new 5 per cent. Loan deposited with the Government Agent, ..					4,000	0 0		
Cash in the Bank of Bengal, ...					580	8 3		
Ditto in hand, ...					14	14 0		
							4,595	6 3
					Company's Rupees,...		11,376	4 6

Calcutta Asiatic Society, the 31st Dec. 1849.

Brought forward, 11,376 4 6

Company's Rupees,.... 11,376 4 6

Errors Excepted.
SEEBCHUNDER NUNDY.

Dr. *Abstract Statement of Account Current of Journal Asiatic Society for the year* 1849. Cr.

RECEIPTS.				DISBURSEMENTS.			
To Amount of Collections from Subscribers during the year, ...	Rs.	1,498	0 0	By Amount paid to the Secretary Asiatic Society on account General Fund, ...	Rs.	1,395	0 0
To Balance of Account Current closed on the 26th December 1848, ...		5	12 4	By Balance in the Bank of Bengal on separate account, ...		108	12 4
Company's Rupees,.....		1,503	12 4	Company's Rupees,.....		1,503	12 4

E. E.

SEEBCHUNDER NUNDY.

Calcutta Asiatic Society, the 31st Dec. 1849.

Abstract Statement of Oriental and other Publications sold from the 1st of December, 1847, to the 30th of December, 1848.

Dr.

ORIENTAL PUBLICATIONS.

Fatawe Alamgiri, Vol. I. 3 copies, Vol. III. 4 copies, Vol. IV. 6 copies, Vol. V. 6 copies, Vol. VI. 7 copies, at Rs. 8 per Vol.	208	0	0		
Ináyá, Vol. II. 1 copy, ...	8	0	0		
Istallahat e Sufia, 1 copy, ...	5	0	0		
Mahábhárata, Vol. I. 10 copies, Vol. II. 10 copies, Vol. III. 9 copies, Vol. IV. 11 copies, at Rs. 10 per Vol.	400	0	0		
Index to ditto, Vol. I. 8 copies, Vol. II. 8 copies, Vol. III. 8 copies, Vol. IV. 8 copies, at Rs. 1-8 per copy, ...	48	0	0		
Súsruta, 3 copies, at Rs. 8 per copy, ...	24	0	0		
Naishada, 3 copies, ...	18	0	0		
Rájatarangini, 2 copies, ...	10	0	0		
Tibetan Grammar, 1 copy, ...	8	0	0		
Tibetan Dictionary, 1 do., ...	10	0	0		
Bibliotheca Indica, 11 Nos., ...	16	8	0		
				755	8 0

JOURNAL.

Journal of the Asiatic Society, 6 Vols. and 61 Nos...	180	8	0		
Hutton's Report on the Valley of Spits, ..	0	8	0		
Roth's Essay on the Vedas, ...	0	6	6		
Asiatic Researches, Vol. XVIII., ...	10	0	0		
				191	6 6

MISCELLANEOUS.

Sanskrita Catalogue, 5 copies, ...	5	0	0		
Persian Catalogue, 6 copies, ...	6	0	0		
Chezy's Sacuntala, 1 copy, ...	10	0	0		
Yajnadatta-badha, 1 copy, ...	3	8	0		
Lassen's Gita Govinda, 1 copy, ...	2	8	0		
Lassen's Institutiones Prakritika, ...	6	0	0		
Hodgson's Aborigines of India, 4 copies, ..	12	0	0		
				45	0 0
Outstanding Bills of 1847.				789	4 0
Total Co.'s Rs...				1781	2 6

Cr.

4th December 1847 to 24th December 1848, By cash paid to F. Greenway, Esq. Offg. Acct. As. Soc., ..	817	10	6		
26th May 1848, do. do. by Lieut. R. MacLagan, ..	123	0	0		
By bill No. 7 of 1847, carried to the debit of H. Torrens, Esq..	134	0	0		
By cash paid by Captain Hannay for a copy of Hodgson's Aborigines of India, ...	3	0	0		
				1077	10 6
By outstanding bills, ...				703	8 0
Total Co.'s Rs...				1781	2 6

E. E.

Asiatic Society, 31*st Dec.* 1848. RAJENDRALAL MITTRA.

Abstract Statement of Oriental Publications, Journal, &c. &c., sold from the 1st of January to the 30th of December, 1849.

Dr.

Fatawe Alamgiri, Vol. I. 6 copies, Vol. II. 4 copies, Vol. III. 4 copies, Vol. IV. 5 copies, Vol. V. 5 copies, Vol. VI. 5 copies, ...				232	0	0	
Sharah-ul-Islam, 14 copies,..				56	0	0	
Anis-ul-Masharrahin, 1 copy, ...				2	0	0	
Kházánat-ul-Ilm, 29 copies, ...				87	0	0	
Tarikh-e-Nádiri, 3 copies, ...				12	0	0	
Mahábhárata, Vol. I. 9 copies, Vol. II. 9 copies, Vol. III. 8 copies, Vol. IV. 10 copies, ...				261	0	0	
Index to do., 44 Vols.				28	0	0	
Súsruta, 1 copy, ...				4	0	0	
Naishada, 10 copies, ...				31	0	0	
Harivansa, 6 copies, ...				18	0	0	
Rájatarangini, 2 copies, ...				7	0	0	
Bibliotheca Indica, 103 Nos.				105	0	0	
Sanskrita Catalogue, 2 copies, ...				2	0	0	
							845 0 0
JOURNAL.							
Journal of the Asiatic Society, 9 Vols. and 55 Nos.,..							224 0 0
MISCELLANEOUS.							
Kosegarten's Panchatantra, 5 copies, ...				30	0	0	
Meghaduta, 1 copy, ...				1	8	0	
Hodgson's Aborigines of India, 2 copies, ..				6	0	0	
Bohtlinck's Pániní, 2 copies, ...				16	0	0	
Sacuntala, 2 copies, ...				12	0	0	
Málavika Agnimitra, 1 copy, ...				2	0	0	
Leech's Grammar, 123 copies, ...				61	14	5	
Delius's Prákrita Roots, 1 copy, ...				2	0	0	
Hæberlin's Anthology, 2 copies, ...				12	0	0	
Burnouf, Commentaire sur le Yacna, 1 copy, ..				10	0	0	
———, Memoire sur deux Inscriptions Cuniformes, 1 copy, ...				3	0	0	
Grafenhan's Bibliotheca Sanskritika, 2 copies, ..				4	0	0	
Travels of Ibn Batuta, 1 copy, ...				6	0	0	
Lassen's Indesche Alterthums Kundé, 2 copies, ..				20	0	0	
Stenzler's Curriculum Figvinum, 3 copies, ..				18	0	0	
Aufrecht's De Accentu Compositorum Sanskriticorum, 1 copy,..				1	8	0	
Spigel's Liber de Officis Sacerdotum Buddhicorum, 2 copies, ...				2	0	0	
Roer's Vedánta Sára, 2 copies, ...				1	0	0	
History and Literature of the Vedas, 3 copies, ..				1	3	3	
Report on the Island of Chaduba, 1 copy, ..				0	8	0	
Blyth's Notices of new or little known species of Birds, &c., ...				4	0	0	
							214 9 8
Outstanding Bills as per acct. of 1848, ...							703 8 0
						Cos. Rs...	1987 1 8
To outstanding Bills of 1846, omitted in former acct.							37 8 0
						Co.'s Rs.	2024 9 8

Cr.

By cash paid to Mr. F. Greenway and Bábu Sivachandra Nandi, from the 1st of January to the 31st of December, 1849,..	796	11	3			
Ditto by Messrs. G. C. Hay and Co. to ditto on the 18th of October, 1849, ...	19	0	0			
Ditto by Messrs. J. and R. Watson on account Captain J. D. Cunningham,..	66	0	0			
Ditto by J. J. Moore, Esq...	100	0	0			
Ditto by Major E. Thoresby, ...	60	8	0			
				1042	3	3
By outstanding Bills, ...				982	6	5
			Co.'s Rs...	2024	9	8

Errors and omissions excepted.

RAJENDRALAL MITRA.

Asiatic Society, 31*st December*, 1849.

Books received into the Library during the year 1849.

English, ...	98 Vols.
French, ...	18 ,,
German, ...	41 ,,
Greek, ...	1 ,,
Latin, ...	54 ,,
Dutch, ...	3 ,,
Norwegian, ...	20 ,,
Coptic, ...	1 ,,
Sanskrita, ...	37 ,,
Bengali, ...	3 ,,
Arabic, ...	8 ,,
Persian, ...	33 ,,
Urdu, ...	4 ,,
Total,	321 Vols.

ASSETS.

Amount of Bills outstanding from Members including those for the 4th Qr. of 1849.					
Bills realizable,.....	Rs.	5,571	5	0	
Ditto in Suspense, ...		3,424	0	0	
				8,995	5 0
Ditto ditto outstanding on account Journal Asiatic Society, including those due on the 1st Jan. 1850,..				2,414	0 0
Ditto ditto outstanding on account sale of Books in the Library, ...				982	6 5
Ditto ditto outstanding on account *Bibliotheca Indica*,				98	0 0
Balance in the hands of the London Agents, Messrs. W. H. Allen and Co. as per their account closed on the 30th June, 1849, £63-11-1 @ 2*s*.				639	8 8
Amount due from the Batavian Society of Arts and Sciences for Books purchased and supplied to them,				83	1 9
Ditto ditto from Mr. Hodgson on account, ...				33	12 0
Balance due from Mr. Bennett, ...				304	1 4
Company's Rupees,.....				13,550	3 2

LIABILITIES.

By amount due to the Baptist Mission Press as follows:—For printing the Society's Journal up to August 1849, inclusive, ...	Rs.	3,388	0	0	
Ditto ditto Miscellaneous Papers, Catalogue of Curiosities Society's Museum, &c. &c.....		1,981	4	0	
Ditto ditto Miscellaneous Articles, of which bills have not been submitted,.		100	0	0	
				5,469	4 0
Add amount of allowance fixed by the Council for printing the Society's Journal from September to December, being four months at 250 per month, ..				1,000	0 0
By amount due to Mr. Vos, being balance of his account for repairing the Society's Premises, ...				380	10 3
By ditto due to Hon'ble Sir Jas. W. Colvile, ...				700	0 0
By ditto ditto to Mr. Laidlay,.....				459	7 4
By ditto ditto to Mr. Torrens, ...				934	0 0
By ditto ditto to Mr. Muir,.....				268	0 0
Company's Rupees,.....				9,211	5 7

E. E.

SEEBCHUNDER NUNDY.

31*st December*, 1849.

N. B.—The amount cost for printing Mr. Blyth's Catalogue of Birds (now in the press) is estimated by Mr. Thomas to be about,.....Co.'s Rs. 688 0 0

LIST OF MEMBERS

OF THE

ASIATIC SOCIETY OF BENGAL.

Anderson, Major W.
Avdall, J. Esq.
Abbott, Capt. Jas.
Alexander, Henry R. Esq.
Austen, Lieut. Albert G.
Barlow, Sir R.
Benson, Lieut.-Col. R.
Beaufort, F. L. Esq.
Birch, Lieut.-Col. R. J. H.
Blagrave, Lieut. T. C.
Bogle, Major A.
Bowring, L. R. Esq.
Briggs, Lieut. D.
Broome, Capt. A.
Buckland, C. T. Esq.
Bushby, G. A. Esq.
Batten, J. H. Esq.
Brodie, Capt. Thos., 5th N. I.
Beckwith, J. Esq.
Bell, Dr. Adam,
Blundell, G. Esq.
Banks, Capt. J. S.
Bazely, Capt. F. R.
Beadon, C. Esq.
Bruce, Lieut. R. C. D., H. M. 29th N. I.
Campbell, A. Esq.
Cheap, G. C. Esq.
Colvin, B. J. Esq.
Colvin, J. R. Esq.
Corbyn, F. Esq.
Colvile, The Hon'ble Sir J. W.
Cust, R. N. Esq.
Currie, E. Esq.
Cunningham, Capt. J. D.
Champneys, Capt. E. G. L.
Colebrooke, E. Esq.
Davidson, T. R. Esq.
Dodd, Jas. Esq.
Dirom, W. M. Esq.
Douglas, Capt. C.
Dwarkanath Das Basu, Bábu.
Dalton, Lieut. E., 9th N. I.
Earle, W. Esq.
Elliot, W. Esq. (M. C. S.)
Edgworth, M. P. Esq.
Elliot, Sir H. M.
Elliot, J. B. Esq.
Frith, R. W. G. Esq.
Frith, W. H. L. Esq.
French, Gilson R. Esq.
Falconer, Dr. H.
Forbes, Lieut.-Col. W. N.
Flytche, Capt. E.
Grant, J. W. Esq.
Greenway, W. Esq.
Gubbins, C. Esq.
Gobind Chunder Sen, Bábu.
Grote, Arthur, Esq.
Hannay, Capt. F. S.
Henry, Dr. Wm.
Hodgson, B. H. Esq.
Hopkinson, Capt. H.
Houston, R. Esq.
Huffnagle, C. Esq.
Harimohan Sen, Bábu.
Hannyngton, Capt. J. C.
Hall, F. E. Esq.
Hamilton, R. N. C. Esq.
Hay, Andrew, Esq.
Hearsey, Lieut.-Col. J. B.
Hayes, Capt. Fletcher,
Heatly, S. G. T. Esq.
Jackson, W. B. Esq.
Jenkins, Lieut.-Col. F.
Jones, R. Esq.
Johnstone, John, Esq.
Jerdon, T. C. Esq.
James, Lieut. H. C., 32nd N. I.
Kerr, W. Seton, Esq.

Kittoe, Capt. M.
Kean, Rev. W.
Laidlay, J. W. Esq.
Latter, Capt. T. L.
Locle, G. Esq.
Lackersteen, Count J.
Logan, J. R. Esq.
Lamb, Dr. G.
Low, Col. J. H.
Lawrence, Sir H. M., K. C. B.
McLeod, D. F. Esq.
Mill, J. B. Esq.
Muir, J. Esq.
Mitchell, A. Esq.
Money, D. J. Esq.
Maclagan, Lieut. R.
McClelland, Dr. J.
Maxwell, Lieut. H.
Money, W. J. H. Esq.
Macrae, Dr. A. C.
Martin, Dr. W.
Newmarch, J. Esq.
Ommaney, M. C. Esq.
Ouseley, Lieut.-Col. J. R.
O'Shaughnessy, W. B. Esq., M. D.
Peel, The Hon'ble Sir L.
Phayre, Capt. A.
Prosanna Cumar Tagore, Bábu.
Pratt, Rev. J. H.
Pakenham, Capt. G. D.
Pratab Chunder Singh, Rájá.
Ramanath Tagore, Bábu.
Ramgopaul Ghose, Bábu.
Ripley, Lieut. F. W.
Rogers, Capt. T. E.
Ram Chunder Singh, Rájá.
Ramaprasad Roy, Bábu.
Rowe, Dr. J.
Rajendra Datta, Bábu.
Sleeman, Lieut.-Col. W. H.
Sherwill, Lieut. W. S.
Spilsburry, G. G. Esq.
Strachey, Lieut. R.
Sut Churn Ghosaul, Rájá.
Stewart, Dr. D.
Slater, Rev. S.
Staples, Lieut. N. A.
Scott, Jas. S. B. Esq.
Sandes, T. C. Esq.
Strachey, John, Esq.
Stubbs, Lieut. F. W.
Shave, J. T. Esq.
Thomason, The Hon'ble J.
Torrens, H. Esq.
Trevor, C. B. Esq.
Thuillier, Lieut. H. E. L.
Thomas, R. Esq.
Thurburn, R. V. Esq.
Udny, G. Esq.
Walker, H. Esq., M. D.
Willis, J. Esq.
Wilson, The Right Rev. Daniel, The Lord Bishop of Calcutta.
Waugh, Lieut.-Col. A. S.
Wattenback, A. Esq.
Young, Dr. R.

List of Members elected in 1849.

W. Mackintosh, Esq.
W. J. H. Money, Esq.
Capt. F. R. Bazely.
Dr. A. C. Macrae.
C. Beadon, Esq., C. S.
Dr. J. Row.
R. V. Thurburn, Esq.
Lieut. R. C. D. Bruce.
Rájá Pratab Chunder Singh.
Bábu Rajendra Datta.
Capt. E. Fytche.
Dr. W. Martin.
Arthur Grote, Esq., B. C. S.

List of Members who have returned from Europe and rejoined the Society.

Lieut.-Col. W. N. Forbes.
A. Wattenbach, Esq.
Capt. Fletcher Hayes.

LOSS OF MEMBERS DURING THE YEAR 1849.

By departure to Europe.

A. Christopher, Esq.
M. C. Gibilin, Esq.
H. F. Hough, Esq. M. D.
Hon'ble Sir T. H. Maddock.
Major H. C. Rawlinson.
Capt. R. Ouseley.
M. Gladstone, Esq.
C. B. Skinner, Esq.
C. B. Thornhill, Esq.

By death.

A. C. Dunlop, Esq.
Dr. J. Hæberlin.

By withdrawal.

Major T. W. Birch.
J. Furlong, Esq.
W. Grey, Esq.
G. Hill, Esq.
J. Kerr, Esq.
J. Mackenzie, Esq.
Rájá Rádhákánt Deb.
Rev. J. Richards.
Rev. P. S. Sandberg.
Capt. S. R. Tickell.
G. R. Wilby, Esq.
A. Gilmore, Esq.
C. J. Montague, Esq.
John Muller, Esq.
W. Tayler, Esq.

LIST OF HONORARY MEMBERS.

Baron von Hammer Purgstall, Aulic Counseller, Vienna.
Professor Augustus von Schlegel.
——— Rasmussen,
——— Oersted,
——— Frœhn.
} Of the Royal University of Copenhagen.
Monsieur Garcin de Tassy.

Sir John Philippart.
Professor R. Jameson,
Count Carlos de Vidua.
—— De Noe.
Professor Francis Bopp.
———— E. Burnouf.
———— Christ. Lassen.
Monsieur J. J. Marcel.
Professor Heeren.
———— M. J. Klaproth.
The Rev. William Buckland, D. D.
Sir John S. W. Herschel.
Col. W. H. Sykes.
Chevalier Ventura.
General M. A. Court.
Professor Lea, *Philadelphia.*
Dr. Harlan, *Philadelphia.*
Monsieur P. A. Lair, President of the Society of Agriculture and Commerce, Caen.
Professor H. H. Wilson.
Sir George Staunton.
Baron Schilling, *Cronstadt.*
Chevalier Amadie Jaubert, *Paris.*
Professor L. Agassiz, *Neufchatel.*
Monsieur Renaud, *Paris.*
His Highness Hekekyan Bey, *Egypt.*
Dr. Ewald, *London.*
Hon'ble Sir Edward Ryan, *London.*
Professor Jules Mohl, *Paris.*
Capt. William Munro, *London.*
His Highness the Nawab Nazim of Bengal.
Dr. J. D. Hooker, R. N. F. R. S.
Professor Henry, *Princeton, United States.*

ASSOCIATE MEMBERS.*

Blyth, E. Esq.
Dawe, W. Esq.
Delessert, A. Esq.
Keramut Ali, Syud.
Long, Rev. J.
McGowan, Dr. J.
Piddington, H. Esq.
Roer, Dr. E.
Tregear, V. Esq.

* Exempt from payment of Subscriptions.

6TH FEBRUARY, 1850.

The Lord Bishop, in the chair.

The proceedings of the last meeting were read and confirmed.

Letters were read—

From Secretary to the Government of Bengal, forwarding a map of the Behar district.

From Dr. Campbell, Darjiling, returning thanks for the congratulations of the Society on his liberation from imprisonment in Sikim.

From Mr. Joseph Casella, Consul General of H. M. the King of Sardinia, presenting an illustrated work by the Duke of Serradifalco, on the ancient monuments of Sicily.

The thanks of the Society were voted to the Duke for the present.

From Mr. Mansel, Serampore, regarding the proposed Exhibition of Arts, &c. in England, in 1851.

From Dr. Roer, forwarding extract of a letter from Professor Lassen, respecting Mr. Laidlay's proposed Edition of the ancient inscriptions of India.

From Mr. J. W. Laidlay, describing a new mode of preparing facsimiles of coins.

From the same, forwarding a pencil drawing of an ancient sculpture at Malda, forwarded by Mr. Gray of that place.

From Major Durand, presenting a valuable collection of Burmese manuscripts, made by him, while Commissioner at Moulmein.

From Captain Hutton, complaining of the non-acknowledgment of a donation of 130 specimens of mammalia and birds and a collection of shells, made by him through Mr. Blyth, to the Asiatic Society.

Mr. Blyth mentioned that they had been duly presented to the meeting and inserted in the Catalogue, and the receipt noticed in the Journal.

The Hon'ble President having intimated his wish that the proposition respecting Col. Forbes' election, as Honorary President, be reserved for consideration at the next meeting, it was decided to postpone it as desired.

The Curators and Librarian having presented their reports the meeting adjourned.

Confirmed, J. R. COLVIN, *Chairman.*

W. B. O'SHAUGHNESSY, *V. P. and Secretary.*

Library.

The following books have been added to the Library since the last meeting.

Presented.

Memoirs of the Royal Astronomical Society. Vol. XVII. Part I.—Presented by the Society.

An Analytical Digest of all the Reported Cases decided in the Supreme Courts of Judicature in India, in the Courts of the Hon'ble East India Company, and on Appeal from India to Her Majesty in Council. By W. H. Morley. Part VI.—By the Government of India.

The Burmese Reader by Lieut. D. A. Chase. Moulmein 1849, 4 copies (Pamphlets).—By the same.

Journal of the Indian Archipelago. For November and December 1849. —By the Editor.

Ditto Ditto. 2 copies.—By the Government of Bengal.

Journal of the Academy of Natural Sciences of Philadelphia. New series, Vol. I. part 3.—By the Academy.

Monthly Notices of the Royal Astronomical Society. Vol. VIII.—By the Society.

Journal of the Madras Literary Society, No. 35.—By the Society.

The Oriental Baptist, No. 38.—By the Editor.

The Upadeshaka, No. 38.—By the Editor.

The Oriental Christian Spectator for January, 1850.—By the Editors.

The Calcutta Christian Observer for February, 1850.—By the Editors.

Supplement to No. XIV. Picnic Magazine.—By the Editor.

Comparative Philology (from the Calcutta Review, No. 24).—By Rev. J. Long.

Tattvabodhiní Patriká, No. 77.—By the Tattvabodhiní Shabha'.

Essay on Arabic Poetry, in Arabic, by Mauluvi Reza Hossen Khán Báhádur.—By the Author.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of December, 1849.—By the Deputy Surveyor General.

Map of the District of Behar.—By the Government of Bengal.

Exchanged.

The Athenæum, Nos. 1149, 50—53-54.

Calcutta Review, No. 24.

Purchased.

The Annals and Magazine of Natural History, No. 23.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of February, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.966	60.2	60.8	58.8	N. W.	Cirro-cumuli	30.013	71.5	71.6	64.2	E.	Cirro-strati	29.954	79.0	78.3	65.5	N. E.	Clear
2	30.019	62.2	62.6	56.0	N.	Ditto	.047	68.9	69.0	59.5	N. E.	Cirro-cumuli	.998	75.1	75.0	62.9	N.	Cirro-strati
3S	.111	59.2	60.0	58.3	N.	Scattered-clouds.	.188	70.3	70.2	62.3	N. E.	Cumuli	30.146	75.8	74.8	64.3	N.	Cumuli.
4	.174	58.0	58.0	55.2	Calm.	Clear	.237	70.0	70.4	60.2	N.	Clear	.182	76.2	75.0	62.0	N.	Clear
5	.130	57.0	57.0	53.0	Do.	Ditto	.189	68.7	69.9	59.2	N.	Ditto	.125	76.2	75.4	59.0	N. N. W.	Ditto
6	.088	54.2	54.4	51.0	Do.	Ditto	.147	66.0	67.2	58.3	N.	Ditto	.081	76.2	76.1	60.8	N. N. W.	Ditto
7	.089	55.8	55.4	52.3	Do.	Ditto	.139	70.1	71.3	60.0	N. N. E.	Ditto	.094	77.7	77.1	62.8	N.	Ditto
8	.146	57.0	57.7	55.2	Do.	Ditto	.202	72.0	73.0	62.5	N.	Ditto	.156	79.3	79.0	64.2	N. N. W.	Ditto
9	.180	60.3	60.4	56.8	N.	Cirro-strati	.212	71.5	72.3	62.9	N. N. W.	Cirro-cumuli	.151	79.7	79.8	66.9	N. W.	Cirro-cumuli
10S	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
11	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
12	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
13	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
14	.000	59.9	60.8	59.2	N. W.	Clear	.060	73.5	74.3	64.0	S. S. W.	Clear	.014	81.3	81.6	66.2	S. S. W.	Clear
15	29.997	64.8	65.3	64.7	S. W.	Ditto	.070	73.6	74.2	67.4	S. W.	Ditto	.028	82.0	81.9	67.0	W. S. W.	Ditto
16	30.006	64.7	64.2	64.2	Calm.	Foggy	.061	73.1	75.0	69.1	N. N. W.	Ditto	.027	83.8	83.8	66.8	W.	Ditto
17S	.006	63.8	64.0	59.8	Do.	Clear	.071	78.3	79.2	66.4	N. E.	Ditto	.022	85.0	84.4	66.8	E.	Ditto
18	.009	63.6	64.2	58.5	N.	Ditto	.072	76.3	77.6	65.7	N. E.	Ditto	.083	83.5	84.0	67.6	N.	Ditto
19	.023	66.0	66.7	60.2	N.	Ditto	.084	77.0	78.3	66.8	N. E.	Ditto	.046	84.9	83.9	68.2	N.	Ditto
20	29.980	64.0	65.8	62.3	N. E.	Cirro-strati	.038	78.2	78.8	67.0	N. E.	Cirro-strati	.002	85.7	85.7	70.4	S. S. E.	Cirro-strati
21	.959	67.0	67.4	62.0	N.	Cloudy	.024	69.6	68.7	62.4	N. N. W	Drizzly	29.970	78.0	78.3	69.8	N.	Cirro-cumuli
22	.952	65.4	65.8	63.3	N. E.	Ditto	.019	69.7	69.8	67.2	S. S. E.	Cirro-strati	.988	79.0	78.5	68.4	S. E.	Clear
23	30.015	66.7	65.9	65.3	N. N. E.	Rainy	.085	71.3	71.4	68.7	N.	Cumuli	30.040	78.1	77.3	70.2	E.	Cumuli
24S	.001	66.2	66.6	66.3	S.	Foggy	.043	73.0	73.0	71.0	N. W.	Ditto	29.991	81.2	81.2	70.2	N. W.	Ditto
25	29.958	70.2	70.5	69.8	S.	Clear	.002	78.2	78.8	72.3	S. W. sp.	Ditto	.948	84.8	84.7	72.7	S. W.	Ditto
26	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
27	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
28	.919	67.2	67.0	67.0	N. N. W.	Foggy	29.993	72.9	72.2	69.0	N. N. W.	Cumuli	.961	78.6	78.8	70.0	N. N. W.	Cumuli
..	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
..	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
Mean	30.033	62.4	62.8	60.0	....	.....	30.091	72.4	73.0	64.8	....	....	30.044	80.1	79.8	66.5	....	....

[*Meteorological Register, continued.*]

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. 40. Upper.	Feet. 4. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.887	84.1	83.7	69.6	S. W.	Cirro-cumuli	29.881	84.1	82.9	69.3	S. W.	Cirro-cumuli	29.879	80.0	78 0	68.7	S.SW.	Cirro-cumuli	85.8	73.1	60.3	103.0	..	..		1
.948	78.0	76.5	63·2	N. W.	Cirro-strati	.951	76.2	74.9	62.6	N. W.	Ditto	.979	73.2	72.6	62.5	N.	Scatter'd clouds	79.7	71.1	62.4	97.2	..	..		2
30.087	72.3	78.3	65.5	NNW	Cumulo-strati	30.080	76.7	75.8	64.0	N.	Cumuli	30.101	74.8	73.3	64.4	N. W.	Cumuli	81.0	70,2	59.3	102.7	..	..		3
.087	79.0	78.3	62.4	N.	Clear	.076	78.8	77.2	62.3	NNW	Clear	.087	75.3	73.3	62.6	NNW	Clear	80.5	69,4	58.3	102.0	..	..	☾	4
.042	79.1	77.8	60.8	N. W.	Ditto	.025	79.5	77.8	61.3	N. W.	Ditto	.035	75.3	73.2	60.2	N.	Ditto	80.9	69.0	57.0	101.7	..	..		5
29.997	79.4	78.2	59.8	NNW	Ditto	29.978	79.0	78.2	60.0	N. W.	Ditto	29.988	75.0	73.1	60.2	N. W.	Ditto	81.0	67.8	54.6	100.3	..	..		6
30.030	80.4	80.2	63.0	N. W.	Ditto	30.023	80.9	79.7	62.7	N. W.	Ditto	30.041	75.9	73.9	62.2	W.	Ditto	82.6	69.3	56.0	103.6	..	..		7
.085	82.8	82.4	64.3	NNW	Ditto	.079	83.2	82.0	64.0	N.	Ditto	.089	78.8	76.8	64.4	N. W.	Ditto	84.1	70.9	57.7	104.6	..	..		8
.085	82.8	81.9	69.2	NNW	Cirro-strati	.074	80.8	80.0	69.7	w.nw.	Cloudy	.082	76.8	75.3	66.0	W.	Cloudy	88.6	72.0	60.4	97.3	..	..		9
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	..	..		10
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29.929	84.2	84.0	65.5	S.SW.	Cumuli	29.920	84.4	83.9	66.3	WSW	Cumuli	29.930	78.7	77.8	65.6	S.	Clear	85.4	72.9	60.4	102.2	..	..		14
.947	86.7	86.4	67.3	WSW	Clear	.937	87.2	86.4	66.8	WSW	Clear	.954	81.6	77.8	68.3	W.	Ditto	88.0	76.7	65.3	108.2	..	..		15
.947	87.0	86.3	67.2	WSW	Ditto	.926	87.5	86.3	67.7	WSW	Ditto	.922	82.3	78.8	67.8	S. W.	Ditto	88.8	76.7	64.5	109.8	..	..		16
.951	87.7	86.3	66.4	NNW	Ditto	.937	87.6	85.8	66.0	NNW	Ditto	.938	83.0	81.2	66.3	NNW	Ditto	89.1	76.5	63.8	110.0	..	..		17
.949	87.0	87.0	68.3	NNE.	Ditto	.925	86.9	85.2	66.7	NNW	Ditto	.921	82.4	81.4	66.6	N.	Ditto	88.5	76.2	63.9	105.8	..	..		18
.951	88.3	88.0	69.3	N.	Ditto	.931	89.0	87.2	68.0	NNW	Ditto	.933	83.6	82 2	69.6	W.	Ditto	90.0	77.8	65.5	112.0	..	..		19
.931	86.0	85.0	68 9	WSW	Cloudy	.921	84.1	83.7	68.9	NNW	Cloudy	.934	80.4	80.3	67.3	NNW	Cloudy	89.6	77.0	64.3	105.0	..	..	☽	20
.879	82.4	81.7	69.6	E.	Cumuli	.855	83.8	82.0	69.4	N. E.	Cumuli	.863	79.8	78.8	68.3	E.	Scatter'd clouds	83.8	75.3	66.8	102.0	..	0.14		21
.900	82 0	82.0	69.6	WSW	Ditto	.876	82.8	80 8	69.5	W.	Ditto	.877	79.8	78.7	69.8	S. W.	Cumuli	84.0	74.8	65.6	106.0	..	1.06		22
.949	82.3	81.2	71.2	N. W.	Cumulo-strati	.928	83.1	80.3	71.0	N. E.	Ditto	.944	79.0	78.0	70.3	NNW	Clear	84.0	75.0	66.0	106.2	..	..		23
.908	84.4	82.8	67.2	w. nw.	Cumuli	.898	84.3	84.0	68.2	w.nw.	Ditto	.893	81.2	79.2	69.9	S.	Ditto	85.9	75.9	65.9	107.6	..	..		24
.873	87.1	86.2	74.3	S. W.	Cumulo-strati	.863	86.2	85.2	70.6	S. W.	Cumulo-strati	.876	80.3	79.8	70.0	S.SW.	Cumuli	88.2	79.3	70.3	103.0	..	..		25
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	..	0.56	☉	26
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	..	0.24		27
.889	81.2	80.2	70.3	NNW	Cumuli	.885	80.7	79.3	69.3	NNW	Clear	.902	76.9	75.2	68.2	N.	Clear	82.0	74.6	67.2	100.8	..	..		28
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29.966	83.2	82.5	67.0	....	....	29.953	83.0	81.8	66.6	....	...	26.962	78.8	77.2	66.3	....	....	84.8	73.8	62.5	104.1	..	2.00		

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JOURNAL

OF THE

ASIATIC SOCIETY.

No. III.—1850.

Extracts from Dr. Voysey's *Private Journal when attached to the Trigonometrical Survey in Southern and Central India*, No. II.

In Vol. XIII. of the Journal, p. 853, will be found the first of these papers, though in point of time the last. The Editor now proposes to complete the series much of which, in connection with the papers published by the late lamented Captain Newbold, will be found of great interest and importance in our present scanty knowledge of the geology of these extensive districts.—Ed.

*Extract from D. H.'s Manuscript.**

The mountainous tracts of which this Peninsula is composed, consist chiefly of primitive formations of which the old trap with all its subordinates is the principal.

The hills in general do not rise to any great perpendicular height, few are higher than 5000 feet and most only 1000 to 1500, and those close to the sea 5 to 600 feet.

The country south of the Krishna may be divided into the *eastern coast*, the *table-land*, and the *Malabar coast*.

The trap formation including the older, later and newest, is the most common, producing gold, diamonds, &c.

The coast between the sea and the mountains is low, although one occasionally meets with slight elevations of 50 or 100 feet.

The general ascent is indeed so trifling that although the ghauts are from 50 to 80 miles from the sea, their feet are seldom elevated more

* It is not now known who this gentleman was, but Dr. Voysey, had evidently found this general sketch worth notice and the Editor has thus inserted it also.

than a few feet above it, this has been determined by actual measurement in the Godavery, Krishna and Cavery.

On the coast of Coromandel the first stratum which meets the eye is a moveable sand, interspersed with black particles of magnetic ironstone, common about Madras and sold in the Bazars under the name of Surammmely.

Next is found a stiff loam very sterile, extending 2 miles inland, when other alluvia, such as sand, marl, disintegrated calc tuff, and a mixture of sienitic gravel, are seen in alternating strata.

The calc tuff is generally covered by a thick stratum of rich black mould, which appears to proceed from the quick destruction of the vegetables by the calc tuff. The marl is often 20 feet deep, and does not contain animal remains of any kind; rolled hornstone, fragments of sienite and pebbles are found in it. It very often covers the stratum in which the diamond is found.

The acclivities which are found along the coast about Madras and Nellore consist of iron clay used for bricks, Dr. B.'s laterite. The small pebbles or stones in it, resemble floetz greenstone: mica is also found near Pondicherry, and a secondary floetz lime with shells used for paving the streets.

In the vicinity near the sea are found remarkable petrifactions of large pieces of trunks and branches of tamarind wood.

Transition limestone is met with in some abundance, and in mountain masses near the Krishna at Chintapally. It might be taken for floetz limestone, but there are animal remains in it. Calc tuff and sienite are found, and a black limestone which burns white. About Lat. 13° 14′ N. mountains of transition flinty slate make their appearance 3000 feet above the level of the sea. The Pulicat hills.—They run in uninterrupted ranges from about 15 to 20 miles in the direction of the coast. The hill on which the Tripety Pagoda stands belongs to this rock and it further continues to the banks of the Pennar.

In the branch, south of Cuddappah which runs nearly east and west, I found small veins of plumbago. Sulphuret of lead with a large proportion of silver is found, 15 miles in a N. E. direction.

The flinty slate appears to rest on greenstone slate, which often makes its appearance in the Pallams, the Pulicat hills, and to the northward.

The hills at Vellore and the big and little Mount at Madras, are mostly transition trap.

They consist of a friable mixture of hornblende, felspar, quartz, and mica, with garnets and pyrope with epidote. The hornblende is found in the hills in nodules in concentric layers like basalt.

Under and among these hills, rocks of the old trap rise often in high ranges with acute points. Felspar, hornblende and quartz with a small proportion of mica, pyrope and epidote enter it as foreign minerals. When the latter, particularly garnet, are absent the felspar is red. Of this rock, the generality of the hills on this coast consist. It seems to rest on granite near the seven pagodas: a rare occurrence, the appearance of the granite along the coast. The granite is particularly striking here on account of its freshness, whilst the former is found tarnishing and scaly.

The hornblende which forms a constituent of our primitive trap is in general shining black, and contains iron in so great a quantity as to be attracted by the magnet when in small particles. It is the same in the greenstone and greenstone slate on which the transition flinty slate of the Pulicat hills rests. The greenstone of that part of the country exposed to the air becomes green, although it is black, and does not contain a particle of copper.

The brown and hydrous copper of Dr. T. is found here and in some places mica slate with large garnets.

A compact greenstone, foliated and ringing when struck, is used for lingams. Common hornblende of an olive-green is found in the Baramaul in Noorcull, in primitive trap with garnets. A remarkable rock called *black granite* procured near Madras, is common augite rock. It occurs only massive, greenish black, opake; in small thin pieces, and on the edges in large pieces, olive-green and transparent. Internal lustre resinous, glistening and splendent; fracture foliated and granular and on the whole uneven. A two fold cleavage is observable, it is semi-hard, rather brittle, easily frangible, Sp. Gra. 3. 20. garnets are found in it and basalt. If the latter indistinct grains of a black colour, foliated fracture and less hard than the augite; the former are of a ruby colour.

Another stone found in this part of the country (Madras), I will call compact hornblende, although it differs in many respects from that rock.

Its colour is Olive green with a lighter greenish grey streak; fracture granularly foliated, opake; lustre glistening on the foliations, for the rest dull. Semi-hard, rather brittle, but difficultly frangible; fragments wedge shaped sp. G. 3. 53. It is perhaps a species of common actinolite.

The Corundum is found frequently in rocks of the old trap formation. The iron which is found accompanying it is common black hornblende. Corundum in rolled pieces occurs in alluvial strata along with the diamond, epidote, greenstone &c.

Among the trap rocks in the southern Baramahl, I have often met with several pieces of actinolite; and near Salem and Namcull in kidneys, native magnesia accompanied with figure stone or agalmatolite.

Of iron ores. I have only found on the coast the common iron sand in the beds of rivers and some swamp ores in the low country.

Besides the abovementioned trap the old clay slate (?) formation occurs and mica slate. The former about the Krishna under transition limestone also with flinty slate on one side and primitive on the other.

Mica slate I have discovered under the greenstone slate near the copper mines.

Extracts from Dr. Voysey's Private Journal.

Friday, 18th November, 1818.—Quitted Paramboor at 11 o'clock, and arrived at the Red hills half past 12. Barometer yesterday at 2 o'clock, 768 m. Ther. 78°: to-day at 2 o'clock same, Ther. 81°. Irregular appearance of the iron clay, sometimes containing large pieces of brown ironstone, but for the most part small, with a considerable quantity of magnetic iron ore. Iron clay formation continues, although covered with a thick bed of sand.

Monday, 16th November, 1818.—The iron clay still continues, but we now and then meet with lumps of quartz and quartz rock, brought to mend the tanks and roads.

Tuesday, 17th November, 1818.—Swam across a considerable stream and found on the banks lumps of fullers' earth lying on a quartzy sand intermixed with bits of quartz.

Wednesday, 18th November, 1818.—On the borders of a tank I found a very considerable quantity of the pyriform brown iron stone,

which I also found at intervals all the way to Nyour Choultry, in the neighbourhood of which it is found in large quantity. The iron clay was frequently seen throughout the journey, sometimes containing both large and small pieces and blocks of quartz. On approach to the Choultry we observed a number of smiths at work. The forge and bellows of the usual rude construction; the iron ore is brought from the neighbouring hills: these hills are continuous with those of Naggery Nose Worramallepett, and appear to be of the same composition; granite at bottom and sandstone at top.

The ore is the slaty red iron ore of mineralogists, and produces tolerable iron. In the neighbouring jungle, several large blocks of granite were visible peeping through the iron clay: in one place containing large specks of black mica, the stratification not real, since it was not continuous. The iron clay exactly resembles that of Midnapoor, containing brown red hematite and quartz. The granite resembles that of Cornwall with more mica, making it somewhat darker. The most remarkable plants are Euphorbia antiquorum, Asclepias aphylla, Cassia auriculata, Gloriosa superba. The extent of the iron clay formation, is well worthy of consideration, and I regret much that my mode of travelling does not allow me to pay more attention to its connexion with other rocks, as yet I have only seen it with granite, upon which it is directly laid.

The water of the tank at this Choultry, built of granite, is very pure and contains very little muriate of soda. I brought from thence marked No. 1, granite, iron clay, and red iron stone brought from the hill of Goondum or Mokush; my information was obtained from the Brahmin of Nyarpet.

Thursday, 19th November, 1818.—A short time after quitting the Chouvadi early in the morning, I observed clay slate coming out in the road, which was strewed for a considerable distance with large pieces of quartz and the iron clay. On examining the water of the tank, I detected sulphate of lime in considerable quantity as well as muriate of soda. I observed lumps of greenish blue clay slate in the village, said to come from the neighbouring hills; the commencement of the Venkatagherry range.

Friday, 20th November, 1818.—I observed granite coming to-day within a few yards of the Choultry, and in another place a large quantity

of flesh-colored felspar in blocks with stripes and lumps of quartz, also mica slate and granite, with a large quantity of green hornblende,* the decomposition of the hornblende leaves a greenish yellow clay very plastic; my time was so short that I was not able to search for the junction of the primary rocks with the iron clay. The heavy rain prevented me from opening the Palanqueen, so that I lost the termination of it. I saw it for the last time about 3 coss from Nyarpet.

Saturday, 21st November, 1818.—Just after quitting Goodoor, I observed large masses of granite cropping out, with a very large proportion of white felspar: during the day large pieces of quartz, sandstone, and iron clay were strewed along the road, but no rocks visible. In the neighbourhood of this village Venkatachellum, there are large masses and the tanks are built of the latter.

Sunday, 22nd November, 1818.—Nellore a long dirty town, built on, and partly of, the iron clay, which is here to be seen in an imperfect sort of stratification or rather seams which are neither parallel nor horizontal. I saw a well, 20 or 30 feet deep dug through the iron clay, which resembles very nearly those specimens presented to Mr. R. by Col. M. said to come from Mysore.

Monday, 23d November, 1818.—Paid a visit to Mr. Sutton at 12 o'clock, and went with him to see the quarries of iron clay. In one place over a stratum of it, the mould was upwards of fifteen feet in thickness and in others less.

I observed pieces of brick and pottery, close to the surface of the clay in the vegetable mould. An antique figure of Buddha built into the masonry that forms the foundation of Mr. Lord's house near the quarries, has a very picturesque appearance. I also visited the iron clay in the banks of the Pennar, where it is seen on the right bank in great abundance: the bed of the river, which is very much choked up by alluvium, and therefore much higher than when the pagoda was built on its banks, is now effecting serious breaches in the wall surrounding it, as well as in a little temple or Chauvadi built on an elevated portion of the iron clay. The alluvium of the Pennar is entirely silicious, mixed with a few shells. I bathed, and found the water, where we crossed, brackish. The iron clay of this neighbourhood contains more cellular cavities and more brown hematite than I have hitherto

* Epidote? undetermined.

seen. The neighbouring hills contain abundance of granite intermixed with hornblende, which I saw in a large piece near the tank.

Wednesday, 25th November, 1818.—We passed a tank built of the iron clay, which was however, entirely grass grown, as well as its banks, and surrounded by ancient granite statues of Siva, having a most romantic appearance, from its evidently great antiquity, and its remoteness from any habitation or temples. The soil and appearance of the country differs greatly from that on the other side of the Pennar, being very silicious. The Mango topes are in great abundance, and a greater extent of land is in cultivation.

Friday, 27th November, 1818.—Quitted Mawildroog for Ramahpatam, the sandy soil and shells betoken our near approach to the sea.

Saturday, 28th November, 1818.—On the hill is a temple in ruins, dedicated to the worship of Jagannath, built of iron clay and primitive greenstone; some images and inscriptions on the latter are very little defaced. A name of Vishnu, Balaram his brother, Shabudra his sister. The hill consists of iron clay and is about a mile in circumference, of an oblong form completely insulated. On the hill I found bits of mica slate, and primitive greenstone, with quartz rock and brown ironstone; but I was told they were all brought from a hill six coss distant. I cannot sufficiently regret my inability to observe the junction of the iron clay with the primitive rocks. The same magnetic ironstone is to be found here as at the red hills; I ascended the hill thrice during my twelve hours' stay.

Monday, 30th November, 1818.—The basis of the hill is granite with a considerable proportion of hornblende stratified; the strata dipping to the south at an angle of 90 and running east and west. On the summit the brown ironstone was pure, but lower down it was intermixed with quartz in considerable quantity. Thermometer 80°. Magnetic iron ore in considerable quantity; also veins of graphic granite: at the foot I picked up some primitive greenstone but saw none on the hill. I counted about 40 eminences of nearly a conical form in the large plain, about 20 miles in diameter. N. B. The ironstone appeared to be on the granite in an unconformable position. I observed the Nepeta Amboinica, seu Indica in great profusion on the summit of the mountain. At the top I saw the sea at a distance of eight miles. The whole country between this place and Ongole appeared to be an alluvial clay mixed

with small pieces of granite, greenstone, blue clay slate, and calc tuff mixed with clay.

Yellumpilly, Tuesday, 1st December, 1818.—The soil of the road and its neighbourhood was a rich black mould, tolerably stiff and retentive of moisture, and appeared to be the result of the decomposition of the primitive trap rock, of which the adjoining hills consist; we came to their feet or rather passed the end of the chain about eight miles from Yellumpilly. I ascended about 100 feet and found them to consist of vertical strata of trap, composed principally of hornblende in large crystals with a little felspar, with veins of hyaline quartz, and of granite containing garnets and very brilliant felspar; also large masses of a compound of what I shall call at present common schorl and grenatite, though in appearance very like. The vein of granite containing the garnets projected beyond the other strata, shewing less facility of decomposition. I saw also brown greenstone. Farther on in the road, we passed over granite and gneiss in vertical strata; the upper stratum consisting of calc tuff in a clayey loam. The variety of minerals, plants, insects, birds, &c. seen through this short march is truly astonishing and I unceasingly regretted my rapid passage through so many novelties.

Thursday, 3rd December, 1818.—I ascended a hill two miles from the Chauwadi, and found primitive greenstone in vertical strata, with veins of granite and brown ironstone: the direction S. E. The soil and cultivation as yesterday: about 10 it commenced raining and continued through the day, preventing me from making any examination of the interesting hills we passed. They appeared to consist of vertical greenstone, mostly conical, some small ones castellated and quite destitute of herbage, the former being but thinly covered. At one time I could count at least 40 of these conical hills, sometimes connected with each other by a low chain, at others quite isolated. In the plain at intervals we passed over the black mould, at others over beds of calc tuff and decomposing greenstone.

Friday, 4th December, 1818.—Our road to Repurlah lay through mountains of the same description as yesterday, greenstone slate in which were beds of quartz. On the road lay calc tuff with pieces of greenstone cemented in it. The calc tuff contains a considerable quantity of argil, and here and there small crystals of quartz. I was

not near enough to any of the hills to ascend, if I had time; when we had performed half our march the rice fields made their appearance, and the road was strewed with bits of a conglomerate very much resembling the iron clay, but consisting of carbonate of lime and ferruginous clay; now and then in the road and in the beds of nullahs highly inclined strata of gneiss and greenstone slate made their appearance. In a little temple built in honor of Hunooman, and in which there was his figure in basso-relievo, the portico was built of a beautiful sienitic granite, the hornblende nearly micaceous, being arranged in stripes with great regularity; my piety prevented me from robbing it of a bit for my cabinet. The face of the country now changed, and the numerous conical hills began gradually to disappear as we left them behind us, and at the end of the long plain before us appeared a chain of hills running N. E., as far as we could see; their shape angular and slightly peaked, altogether different in their general aspect from those we had quitted. I took the height of the Bar. exactly at 12, but discovered that the Calcutta workman had unfortunately neglected to solder the tube, which had shifted its place and totally altered the measure. Thermometer 82°.

Saturday, 5th December, 1818.—The heat and other occupations prevented me from going out until the evening, when I ascended the hill on which a small pagoda is built, due west from the Chauvadi, the steps, in number about 50, were formed of large slabs of clay slate; quartz rock was scattered about in very large masses; the pagoda was built principally of greenstone and schistose limestone, the rock surrounding it and on which it was built, was quartz rock coloured by iron, with veins of brown ironstone.

Sunday, 6th December, 1818.—In consequence of a halt, I rose this morning very early for the purpose of visiting once more the hill and pagoda. I found the whole to consist of quartz rock strongly impregnated with iron, except that in some places, it consisted of a white quartz in large blocks; that which was impregnated with iron had veins of brown ironstone running through it, principally in N. E. direction. The limestone and greenstone as well as clay slate come from hills about two coss nearly due west of the village.

Monday, 7th December, 1818.—The quartz rock continued for some miles from Nacricull, and we there saw a slaty limestone crossing

our path, which continued to appear from time to time until we were past Peddurgall. I afterwards saw large blocks of granite containing epidote; I could not however trace any connexion between the two rocks. The limestone appeared at times in vertical strata and at others nearly horizontal; it is not at all crystalline, and contains a considerable quantity of argil.

Tuesday, 8th December, 1818.—At Dachapilly, on our road to the Kistna, the horizontal limestone, or at least nearly so, made its appearance in great abundance; all the houses and walls of the gardens were built of it. In a pagoda I saw large blocks at least five feet by three. At this place it was to be seen of all colours from a very white semi-crystalline to a black colour. On our road after quitting Dachapilly, it alternated with the argillaceous calc tuff; about four miles from Dachapilly it was seen in great quantity of a dark black colour (compact Lucullite of Jameson), and on our approach to Pondegul it was covered by large and small rounded masses of quartz rock in considerable quantity. When on the bank of the Kistna, it was horizontal and of all colours, zoned, and with a substance intervening between the strata sometimes white and fibrous like tremolite, at others like red and black ironstone; sometimes containing small nodules of red ironstone, and in one instance, from a specimen I found in the bed of the river, green quartz.

Two furlongs above, and one below our present station, are found in the bed of the Kistna, large and small rounded pebbles of granular quartz rock, jasper with quartz and micaceous iron ore interspersed in it. The strata on the bank for at least fifty feet, have sunk in a very abrupt manner, I should suppose, from the gradual undermining of the river which is rapid and very full in the rainy season: it brings with it vast quantities of mud, which it deposits at the sides on the limestone, and thus marks its height. The river is about the breadth of the Thames at Battersea, and becomes suddenly very deep. The extent of this limestone formation, which is the compact limestone of Jameson, and although a secondary formation would form a very handsome polished marble, is very considerable; I first saw it at Nacricull, distant about thirty miles. It appears unfavourable to vegetation as in the jungle we saw nothing but two species of Euphorbia, and some hardy leguminous plants; I have as yet searched in vain for petrifactions.

Wednesday, 9th December, 1818.—This morning I walked for some distance by the river side and on the bank above it; here I found the calc tuff in abundance containing rounded pieces of quartz, &c. exactly similar to those found on the river side. It is more than probable therefore, that these were once enveloped in the same substance, which being decomposed the stones contained in it were either carried down to the river or left on the surface of the limestone; the stratum of calc tuff must, however, have been of little thickness originally or more of it would have remained. I observed the same on this side of the river (Warripilly), which we crossed this morning in round boats of wicker covered externally with leather, and took possession of a large Caravanserai or Musjeed. We strolled after to the ruins of a large pagoda built of the limestone and with very large blocks, some of which were 10 feet in length; it appeared to be attached to a large palace or building surrounded formerly by an extensive wall: in the pagoda were images of Siva and a lingam: the only information we could obtain from a brahmin respecting it, was that it was built by a Hindu rájá many years ago, and was no longer used for worship, having been defiled. All round it were immense masses of the limestone completely denuded of all earthy covering. The walls were built of two solid pieces of stone placed on their edges, leaving a wide intervening space, so that on the outside they appeared 10 or 12 feet thick.

Thursday, 10th December, 1818.—Quitted Warripilly very early, so that I could not see the termination of the limestone. When we quitted Goonderpour where we breakfasted, I observed large blocks of granite strewed in every direction; this continued for a considerable distance, perhaps three or four miles, when irregular lumps of a primitive greenstone appeared among them; I perceived the calc tuff in small pieces, but could not ascertain if it existed in any quantity or whether brought there by accident: after a furlong the granite again; to-day in large masses, in one place an isolated block 20 feet in height and 30 in circumference. At this place the Musjeed and part of the fort is built of it. It is of a white colour, a large proportion of felspar and little mica, quartz moderately abounding: I observed no hornblende in it.

Friday, 11th December, 1818.—I saw by moon-light some precipitous rocks of no great height and at a short distance from the road;

they had the rounded appearance of granitic blocks: at sunrise at a short distance from Teeperty, I saw the granite again, and found on my arrival the principal edifices partly built of it: it is highly crystalline and rather large grained. Strolling to the westward about five hundred yards from the town, I fell in with a large surface, not rising above ten feet from the ground, in an irregular manner, and extending about 100 by 50 feet wide, containing in it rounded and angular masses of a crystalline micaceous greenstone, which I presume the most superficial observer would consider as having been inclosed in the granite, when the latter was in a fluid state. I procured specimens of both granite and greenstone, but could not get at one which shewed their union.

Qy. How high has the iron clay been observed? At Cape G. H. very little above the level of the sea, and there covered by the sand flood; on the coast of Coromandel the highest I have seen about 100 feet; also what connexion with the calc tuff if they may not be traced passing one into the other?

Saturday, 12th December, 1818.—Immense blocks of granite all the way to Nelgondah, scattered without order throughout an extensive plain sometimes rising into hills of various sizes.

Nelgondah is situated between two very large and lofty hills consisting entirely of granite, sometimes white, reddish and black, containing veins of quartz of small size, and without any beds of other rocks as far as I could observe, my time being short; the plain reminded me of that in the neighbourhood of Ongole from the numerous unconnected hills and mountain masses.

Sunday, 13th December, 1818.—The granite rock which we ascended yesterday, and which we found so precipitous on its southern face, was continued in a lengthened declivity for a mile and a half, between Nelgondah and Mungoor. We saw rocks of granite scattered in every direction, and on the surface of those near the road, the calc tuff made its appearance, and from its decomposition gave the thin crust of soil on the surface a red colour; small pieces of greenstone were now and then seen, but no rocks.

Tuesday, 15th December, 1818.—I quitted Narrampet yesterday at three in the afternoon and passed through a beautiful vale between two lofty ridges of granitic hills: at their feet I saw greenstone in abundance.

I also saw a bed of a substance in specific gravity, hardness and fracture, much resembling corundum excepting colour which was green.

Monday, 21st December, 1818.—Facts in illustration of the history of iron clay formation, belonging according to Werner to the floetz trap.

1st. Its extensive diffusion,—Carnatic, Malabar Coast, Orissa, and Midnapore.

2d. Small elevation above the level of the sea.

3d. Connection in the Carnatic with primary rocks, Concan, Malabar.

4th. Its being apparently confined to the coast or extending only a short distance inland.

Saturday, 9th January, 1819.—I quitted the cantonment, Secundrabad, at three o'clock. I met Major Hopkinson at the bund of the tank, who was making or repairing the road destroyed by the overflow of last season; he was in the act of directing the removal of a large block of the greenstone; he told me that the vein was continued beyond the tank in a northerly direction, but that it could not be traced farther south; also that the large vein crossing the road to the residency, was continued in the same direction to Hyauttnuggur 12 miles distant. He mentioned the singular discovery of cairns and druidical circles by W. P. of the Artillery; one of them had been opened lately of a curious formation and several bones had been found in it. The granite continues to wear exactly the same aspect here and on the road we have travelled from Secundrabad, the loggan stones and tors being very numerous.

Sunday, 10th January, 1819.—Halted the whole day at Chinchawalee ka Durga, and in the afternoon visited the tombs of Golconda; large cupolas supported on square pilasters of granite of an extraordinary length, some of them were at least 20 feet high, of solid stone. The tomb is in the centre of the hall, formed by the cupola and is made of greenstone. Of this stone we discovered a vein about 10 feet wide and running east by south, the same direction as those in Hydrabad: the sides were composed of granite intermixed with the greenstone which affected the form of rhomboidal blocks, and was penetrated by quartz veins. From the top of one of the tombs we had a very fine view of the fort of Golconda, which is

not so strong as it is supposed to be. Granite. No diamonds. The characteristics of this country and striking ones they are: loggan stones and tors of the most grotesque appearance, generally smaller than their support or pediment, and in many instances piled together by threes; their origin I shall hereafter speak of:—tanks of large dimensions varying from twenty to thirty miles in circumference, formed by dividing the bed of a natural lake formed during the rains, into two parts by a large mound or bund, through which several locks suffer the water to escape as it is wanted to fertilize the other half of the bed, converted into paddy fields:—the trap or greenstone running twenty miles E. by S. of which I have seen three miles; this stone is used for lingams and gods by the Hindus, and for tombs by the Mahomedans.

Monday, 11th January, 1819.—We travelled through a country similar in all respects to the one we had quitted, except that the granite tors assumed a still more grotesque appearance as we advanced, until within two miles of Puttuncheroo, when the granite suddenly ceased to be visible and a fine plain of alluvial soil was spread out before us covered with trees and bearing the strongest proofs of great capability for cultivation.

Tuesday, 12th January, 1819.—The country between Puttuncheroo and Begumpett, on which the village is built, consisted of the same fertile soil and plain, bounded on the east and west by low granite hills still preserving their peculiar features, when on our arrival at Begumpett the granite suddenly reappeared in our path and formed the hill on which it stands. On descending we found a stiff bluish clay which continued to the place of our encampment Susdanuggur, on the borders of a tank.

Wednesday, 13th January, 1819.—We travelled through the same plain; low granite hills making their appearance until we nearly reached Wondole, when quartz rock forming considerable elevations running in a N. and S. direction; this rock continued for a mile and a half, and then disappeared two or three hundred yards from Jogypett, the place of our encampment. There the rock rises highest, perhaps 50 feet. The quartz appears to have been once covered by an iron clay deposit from the quantity of pisiform iron ore found on it and from that formation being found in the ravines and rents at the sides and bottom of the hills.

Thursday, 14*th January*, 1819.—We passed through Jogypett, and crossed a plain about 7 miles in breadth, between the quartz rock and the hill on which Col. Hampton's flag was fixed; the sides were covered with angular and rounded masses of a rapidly decomposing greenstone or hornblende rock, on breaking which the grey colour of the decomposing surface was found extending into the black crystalline rock for about 2 lines. The soil formed by its decomposition was very rich and retentive of moisture. The form of the surrounding elevations was nearly similar and had nearly the same N. and S. direction. The stone had no perceptible effect on the magnet.

Monday, 18*th January*, 1819.—We quitted Tadmanoo for Jogypett: I had a better opportunity of observing the scattered lumps and masses of granite, which are strewed without order on the plain at the foot of the quartz rock. I observed no difference in its structure from that of Hydrabad. On descending the hill I passed just before the sun rose, through a stratum of air in which the evaporation was rapidly going on, producing a very cold sensation; when I came to the bottom, as I had gone faster than to allow the inferior stratum to be affected by the same cause, the warmth was very agreeable, but as I could go no lower it speedily became cold as before, until the sun rose and counteracted the effect of the evaporation. I forgot to observe that the quartz rock is crystallized in rhombs, some of the angles of which are very perfect.

Tuesday, (Mungul) 19*th January*, 1819.—We crossed the quartz rock which is not above three hundred yards in breadth and on descending into the plain watered by the large tank of Jogypett, soon met with lumps and masses of granite, which gradually increased to the river Manjira, of which it formed the banks: on crossing the river, now about its medium height, we observed with surprise veins of white granite passing through the syenitic granite, which forms its banks. The rock containing these veins is much more susceptible of decomposition from the hornblende which it contains, than the veins of red and white granite, and the appearance produced, was like a fret work, when the broad surface of the rock was exposed; when an edge was left to the action of the atmosphere it was in small diagonal ridges.

This formation appeared confined to a space of a few hundred yards only on the right bank of the river.

It is worthy of remark that this river after we crossed it at Begumpett, takes a considerable turn to the N. and that its bed no longer contains calcedonies there found in it. The mud however is the same, and appears to be that arising from the decomposition of the trap rock of Tadmanoor and elsewhere. After passing some elevated minor granitic hills, we pitched our tents on the borders of a lake at the foot of the station Suldapoorum.

Wednesday, 20th January, 1819.—The mixture of granite and syenitic granite extends to this place, as I observed masses of the syenitic granite imbedded in the former near my door, it reminds me of the same appearance at Teeperty, near Neelgondah; as I have specimens, I shall have an opportunity of comparing them.

Thursday, 21st January, 1819.—About halfway up, the blocks of granite disappeared, and the path presented the decomposing trap rock of nearly the same nature with that of Tadmanoor hill, its decomposition forms the same rich soil as on that hill; I found amongst it specimens of a substance intermediate between heliotrope and hornstone. From the top I counted 33 lakes and should have counted more had the horizon been clear, the hill is not above two hundred feet in height, my barometer fell $\frac{2}{10}$ inch. The neighbouring mountains were slightly elevated above us and their direction and form nearly that of the one we were on, N. and S. and round backed, with two or three slightly conical and more elevated summits in the range; in one instance a range of low hills appeared to cross diagonally, indeed the direction of all was very indistinct and most commonly curvilinear.

Friday, 22nd January, 1819.—For several miles after quitting Suldapoorum, I passed through a beautiful forest of Teak, Mango, Ficus indica, Tamarind, and other fine trees and shrubs mostly leguminous; the soil was partly granite and partly decomposing greenstone, but wherever rocks were visible they were invariably granitic. At a small village situated on an immense divided mass of granite a trap vein (primitive greenstone) crossed my road, running east by south; another about two miles farther became visible, of larger dimensions and was lost in the jungle, in a short time we were surrounded by granitic rocks with the same features which distinguish those of Hydrabad; huge masses with a concentric lamellar structure, loggan stones, tors, &c., but with a large quantity of detritus at the feet.

In the alluvium at the foot of the pass to Chittial, was found a large breccia containing handsome specimens of amethyst quartz accompanied by quartz and cemented together by a silicious sand, strongly impregnated with iron.

Sunday, 24th January, 1819.—I gained the top of the hill after breakfast, and on my way found a considerable quantity of earthy-brown and red ironstone lying scattered in the ravines and in the spaces between the granite rocks, I had no means of judging whether it formerly belonged to any formation such as the iron clay, but it certainly resembled that found in it.

Monday, 25th January, 1819.—The ranges of hills appear to run principally N. and S. from to the east of north. As I descended I found a substance resembling calc tuff, in quartz, in a ravine, lying on the surface and apparently brought down by the rain from higher ground. I rode to Maidurh and round the hill on which the fort is seated: it resembled very much that of Golcondah: I passed a river running from west to east and some strange tors and loggan stones.

Tuesday, 26th January, 1819.—The road lay this day through a tolerably rich country, whose soil was of the black argillaceous kind arising from the decomposition of the transition trap: although on advancing, without apparently changing our level we met with the old granitic sandy soil, which is that of Ringumpett; and in its neighbourhood, where our tents are pitched, is a large grained granite with very handsome bluish grey felspar. I forgot to observe that the forms of the granitic rocks were more varied than I had yet seen them, forming every description of loggan stone and tors that can be conceived.

Wednesday, 27th January, 1819.—The soil alternated from the black cotton soil, as it is called, to the sandy granitic, and the only rocks we saw in this extensive plain were granitic in small lumps and masses. As we approached the river Manjira, they were profusely spread on its banks and in the middle of its stream; here and there in its bed we observed small pieces of calcedony and cornelian. About three miles from our station Ringumpett, I observed a very small-grained reddish granite, much used in the buildings of the village.

Our station was on the transition greenstone, differing in no respect from that of Tandmanoor, the same black thirsty soil covered with the Poa cynosuroides (Kusa grass), also the Semicarpus anacardium and

Butea frondosa. At a lower part of the hill due east from the station, I observed in a stone different from any other I had previously seen, several turritulites and bivalves. The stone is of a bluish grey colour alternating from that to a blackish grey, containing transparent spots of stalactitic silica, its fracture is for the most conchoidal, even, with sharp edges; it is hard, easily frangible and specific gravity about 2.0. I have since found in another part of the hill nearly due north from the station, large nodules of corroded and vesicular flint, and masses of the former stone passing into flint; some of the masses were a foot and a half in diameter. I also in nearly the same direction from the station, at the distance of half a mile, saw the transition trap laid bare; it affected the columnar form and was every where split and divided without any appearance of stratification; in some cases I found on the surface concentric layers rapidly decomposing, enabling me to remove two of its coats.

Friday, 29th January, 1819.—I went this day to the southward and westward as I had previously been to the other quarters of the station. The cultivation has evidently extended all over the hill, fully accounting for the smallness of the shrubs and trees on it: ravines proceed in every direction from the top, forming in the rainy season large torrents, supplying the Manjira with the mud which it then deposits on its banks. In the lower grounds I saw wheat, cotton, ricinus, and linseed in cultivation and in flourishing crops. We had scarcely arrived at the bottom of the hill and about half a mile from the first village when the granite appeared in an abrupt part of the road: near its first appearance we found precisely the same mixture, which I have twice before noticed, viz. at the Manjira and Repurlah; near it was a bed of Meerschaum. The granite with its customary attendants in the shape of loggan stones and tors soon succeeded, with here and there masses of greenstone rolled and scattered without order. The jungle prevented me from tracing their origin. In the evening I visited the fort and saw at least a radius of 30 miles of the surrounding country: we were still in the vast plain, but now more broken in upon and diversified with rocks of granite. This is now redder and contains veins of a still redder granite. It has also less of the appearance of concentric layers and has a more stratified look. The fort is miserably dilapidated, we were admitted without the least cere-

mony. The country appears destitute of springs and depends entirely on the rainy season and a few rivers for its supply of water.

Sunday, 31st January, 1819.—In the evening I observed in the banks of a small nullah, dry in most parts and containing only a muddy water tasteless of any saline impregnation, an incrustation of carbonate of potash from and apparently by the decomposition of the felspar of the alluvial* granite of which its sides were composed, acidified by the atmosphere.

Monday, 1st February, 1819.—A short march from Sauhrampett to Bachapilly; the granite continues to be red and of a small grain; about half way a vein of greenstone passed the road. After breakfast I ascended the hill which has a fine prospect in a southerly view bounded by a range of hills running east and west; their outline was rather different from those I have been amongst for some time past, being more peaked,—the Manjira taking a N. W. direction is in the plain between. The mountain or rather hill of Bachapilly is almost insulated and may be seen on all sides at several miles distance although not 200 feet in height. It consists almost entirely of granite in large irregular masses piled one on the other without order.

Tuesday, 2nd February, 1819.—I left Bachapilly this morning for the river Manjira, its nearest approach being about 4 miles E. S. E. of the hill. The road lay through jungle with heaps of granite at intervals in hillocks, and irregularly strewed over the ground; 2 miles from the encampment the road was crossed by a primitive greenstone vein taking its usual direction. On arriving at the river I found its banks and bed lined and filled with granite: on the right bank the black alluvium was thirty feet above the level and perfectly horizontal on the top: the bed consisted of granitic sand, a few pieces of calcedony not very frequent, and a few shells of the same species I had previously found on crossing it first.

I should have observed that I saw magnetic iron sand mixed with the mud on the bank of the river. Also in a stream which emptied itself into the river, a trace of the efflorescence of carbonate of potash. Our encampment is not above the level of the banks of the river, there being no difference in the barometer observed at each place.

Wednesday, 3rd February, 1819.—The hills have no regular course or direction, one of the proofs of which is that the river runs in the midst of them.

* So in original: *diluvial* is probably intended.—Eds.

Thursday, 4th February, 1819.—I saw also near the village of Bachapilly some singular veins of granite rising through a greenstone or syenitic greenstone, very similar to what I had before observed on the banks of the Manjira: the veins having resisted decomposition much better than the containing rock remained projecting two feet in some instances: it is remarkable that a shift of the veins had taken place: the granite vein was sometimes white and sometimes red like that at the Manjira, the course of what we could discern of this formation, which lay in a field formerly in cultivation and over which the jungle was spreading, was east by south. Visited the Bears rocks, a granitic elevation of thirty feet, distant east by south from the station about 400 yards. Its base consists of a large grain containing red felspar, white compact ditto, and hornblende, forming altogether a beautiful stone; through this mass, a vein of syenitic greenstone differing in width from three feet to a few inches, runs for about fifty feet; this is again crossed by veins of a finer granite nearly resembling that higher up, which is in large blocks apparently placed without order, but an eye accustomed to these rocky elevations, almost peculiar to this country, discerns in these masses the remains of a concentric coat of granite. The remains of strata filled with these granitic veins are very common between.

Friday, 5th February, 1819.—On our road through the plain the same kind of granite to which we had been so long accustomed was frequently seen in irregular masses, two miles from Bachapilly we crossed a small nullah running in the direction of the Manjira. Immediately before entering Polelum a large deposit of quartz rock running E. and W. about half a mile, resting on granite. It was of the same description as that at Joggypett: our road then lay through a plain of black cotton soil, when after a tedious journey through a thick jungle in which nothing was to be seen except masses of granite, and now and then lumps of greenstone, we began to ascend a hill composed of greenstone, having the same characteristics as that of Tandmanoor, containing foliated zeolite in abundance and calcedony lying loose in the ravines, and on its surface high kusa grass (Poa cynosuroides).

Sunday, 7th February, 1819.—I quitted the hill with Everest early to go to Kowlass, we descended one of the ravines so common on these hills and soon came to the usual kind of granite, but could not observe

the junction of the strata; we again began to ascend by a very long road, until the junction between the trap and granite was very distinct, and on looking around us each of the numerous elevations in sight appeared covered with the same kind of trap resting on granite. It is worthy of remark that many trees on the hill are destitute of leaves, whereas in the vallies and ravines they appear to preserve them late in the season. We now began to ascend the hill on which the fort of Kowlass stands, in which there is nothing externally different from that of Medenkah Golcondah; the fort and basis of the hill are of granite both red large-grained, and grey small-grained; on its northern side and near the summit a very considerable vein of greenstone crosses the path running E. S. E. and W. N. W., its northern or upper edge is well defined and consists of greenstone porphyry, containing both crystals of felspar and smoky quartz in the upper part of the vein, but lower down the hill, the stone is a coarse greenstone very subject to decomposition which takes place in a concentric manner and very similar to that of the hill of Boorgâpilly, which is more secondary and contains zeolites; its lower edge is less well defined and instead of being bounded by the granite as on the other side, it is spread for several yards over the granite, lying directly upon it: the breadth of the whole is from about 40 to 50 feet; its length we had it not in our power to ascertain. After my return I visited the village of Boorgapilly, the environs of which consist of a very rich soil formed by the decomposition of the trap; in which soil, where it has not been disturbed, the zeolite has been re-crystallized in silvery plates.

Wednesday, 10th February, 1819.—We crossed a nullah after descending the hill of Kowlass, running east to Manjira. We passed through a large plain of the black cotton soil and arrived at Beechicondah, through a pass of granitic rocks, in which were many loggan stones, and angles were taken. I reduced the temperature of Fahrenheit from 88 to 59, at ½ past three o'clock, P. M. The hill or hills are composed of red syenitic granite very similar to that at Bachapilly, though of a smaller grain. I had an opportunity of observing the communication between this plain and the one which it follows. The whole is flooded during the rainy season, and affords an easy explanation of the universal appearance of the black cotton soil except in the neighbourhood of those hills which are covered by granite alone.

We passed several little rivers on their way eastward to join the Manjira. An explanation of the cause of the total absence of trap on some of the hills must still be sought for.

Thursday, 11th February, 1819.—Through the continuation of the plain to which Beechicondah is the pass. For some distance granitic sandy soil, when a river produced its usual accompaniment the black cotton soil of the trap. We passed Mudnoor at the back of which to the N. E. the granite commences surmounted by the trap. As we crossed the fields and ascended the hills of Bukutapoor, calcedony with green-earth, heliotrope, amygdaloid wacke, with zeolite, stilbite, and carbonate of lime coloured green, were found in great abundance and very fine specimens.

The western side of the hill on which we are encamped is composed of the crystalline transition greenstone, but in the vallies and towards the eastern side it consists of wacke enclosing large specimens of foliated zeolite or stilbite with amygdaloidal pieces of green-earth, which has given its colour to carbonate of lime also contained in it. The wacke is of a greenish grey colour and is destitute of crystals of olivine or of basaltic hornblende.

Friday, 12th February, 1819.—I visited a ravine about a mile due east of the hill, in which the trap was much water-worn. In one part it had very much the external appearance of the Rowley Rag Basalt described in Thomson's Annals, being semicolumnar. In another part, it consisted of nodular concentric masses of which the external coats were decomposed, leaving rings around a lump of more compact nature undecomposed, on others a number of concentric circles visible of various sizes, according to the quantity of the mass decomposed.

Our servants have brought in a number of very handsome specimens of

Wacke contg.	Foliated zeolite.
Ditto	Green earth.
Ditto	Green carbonate of lime.
Ditto	Nodular mesotype, heliotrope.
Ditto with green-earth and calcedony.	
Ditto with Jasper ditto ditto.	

Saturday, 13th February, 1819.—The surrounding hills and acclivities are of two descriptions. The lowest are of granite, are rugged,

consisting of masses heaped one on the other and of loggan stones. The lower are generally east and west, level at their tops, with now and then rounded summits terminating by rather an abrupt slope, and containing vallies having the appearance of the embrasures of a fortification; I recollect seeing the above hills mentioned by Colonel Mackenzie in his journal. The basis of all these hills is granite, reddish and of a small grain.

Sunday, 14th February, 1819.—List of minerals found on the hill and in the neighbourhood of Bhutkahpoor, during a residence of four days there :—

Basis of the hill, granite of a reddish grey colour and small grain.
Granite.

Greenstone, early contg.
Wacke concentric.
.. globular.
.. amorphous.
.. cellular.
Amygdaloid, contg.
Zeolite.
Carbonate of lime.
Green earth.
Brown ditto.
Calcedony.
Zeolite.
foliated.
radiated.
Heliotrope.
Carbonate of lime.
Green earth.
Calcedony.
Quartz.
Cacholong.
Striped agate.

Thursday, 18th February, 1819.—We quitted Bhuktahpoor, at 4 o'clock this morning. I had employed the three preceding days in visiting various parts of the neighbourhood. I found three streams of water descending from the hill in different directions supplied by infiltration: the temperature of one was 10 degrees lower than that of the atmosphere which was 88°. The wacke was not very general and appeared only in beds of small extent, the general rock being an earthy greenstone with no crystals of any description. I found in all the sides of the streams the efflorescence of the carbonated alkali, and I am at a loss to determine, whether it proceeds from the soda of the zeolite or the potash of the green earth. A dense precipitate was occasioned in water from a spring in the neighbourhood of the camp by alum in powder. I arrived at Daigloor, a short time before sunrise; about a mile distant I crossed a river, the bed of which was composed

of large blocks of red crystalline granite contained in a breccia composed of limestone cementing quartz and red felspar; the sand of the bed was similar to that of most other rivers that I have seen, taking their rise from the trap hills and flowing through granite country; consisting of the debris of those two rocks as well as calcedonies and land shells of three sorts, buccinum, helix and pusilla, the right bank of the river resembled exactly that at Ramaleddypett, being lofty and composed of the black cotton soil. I passed over other ranges of the trap, of low height, until our descent into the plain through which the Mubnar passes, the right bank of which is also very steep.

At Adainaor the granite for more than one-half the height of the hill, and covered at the top by a very compact greenstone with crystals of felspar, and a few cavities not filled with any substance. The course of these trap hills was very distinctly seen from this point due E. and W.

Notes on the Zinc Mines of Jáwar, by Captain J. C. Brooke, *Mewar Bheel Corps.*

I have forwarded to your address by dawk banghy a box containing specimens of ore, and of the metal extracted therefrom, found between Kherwárá and Udypura, and shall feel much obliged by your procuring me an analysis of the same, and information as to the composition of the metal* and the best method of smelting the ore. As a description of the place where it is found may prove interesting, I send you a few notes concerning it, and the little information I have been able to obtain of the former methods of working the mines.

2nd. The hilly country of Mêwar has always been known to abound in metalliferous ores, and it is supposed that the produce resulting therefrom was one of the sources of wealth, by which former Ránás of Udypura, were enabled to contend successfully for so many years against the might and power of the Delhi emperors. The most celebrated of these mines and which were worked to the greatest advantage

* Zinc: the specimens sent are very small, and apparently contain very little metal.—Eds.

are undoubtedly those of Jáwar. They are incidentally mentioned by Captain Tod in his Rajasthan, and are stated to have yielded a net revenue of Rs. 220,000 a year. They became closed during the great famine, which devastated western India in A. D. 1812-13, during which the miners, dependant on the surrounding country for food, were obliged to leave a locality situated in the heart of the Bheel country, whose starving population seized all the grain intended for the city of Jáwar. The government of Udypura, too weak to defend itself, and at the time oppressed by the Mahrattas and other freebooters, failed to forward the requisite assistance, and the town suffered the same fate as that of many other places.

3rd. Jáwar lies half way between Kherwárá and Udypura, or some 25 miles due south of the latter place. It is situated in an irregular valley surrounded by hills rising to a height of 1000 to 1500 feet, clothed with rich verdure to their summits, and overlooking an irregular-shaped plain covered over for a space of 5 or 6 square miles, with the monuments of former wealth and importance. Many of these ruins consist of ancient buildings and temples on hills rising in several instances to the height of upwards of a hundred feet, and composed entirely of ashes, which alone fully attest the distant period from which the mines must have been worked. The small river Thirí flows through the plain. It has been in one place bunded up with a masonry bund now in ruins, the excellence of which is attested by the age of the temples built hundreds of years ago on the alluvium of the lake that must have formerly formed an extensive and lovely sheet of water. The chief hill which was used for mining has been worked into a mass of excavations, from which myriads of bats and a stray bear now and then serve to startle the incautious intruders.

4th. It is some 6 years since I first visited Jáwar, and it then occured to me to induce work-people to re-open the mines, but I was unable to procure specimens of the ores from the jealousy of the then Minister of Udypura, as to my intentions in bringing these hidden treasures to light. On a subsequent occasion about 2 years ago, I proposed to the present Máhá Ráná of Udypura, the expediency of opening the mines; he appeared very anxious to do so, and authorized me to obtain miners from Ajmere. Having addressed Lieut.-Col. Dixon on the subject, that officer with great kindness entered fully into my

views and pointed out to me the little use of commencing mining operations at all, unless perfectly sure of the value and richness of the ores to be worked. He mentioned the various descriptions of ore which were most likely to be found, and gave me several useful hints on the subject.

5th. Seeing it was waste of time to do any thing before having procured specimens of the ore, I allowed the matter to rest, till on a recent visit to Udypura, I again mentioned my wish to His Highness the Máhá Ráná, who ordered me to be supplied with whatever was needed, and issued the like orders to an old man, the only remaining inhabitant of old Jáwar, during the time of its prosperity. The Ráná gave me to understand, that the previous year he had directed the old man to smelt a little of the ore which he had done, and brought to Udypura, but afraid of losing his influence, should he divulge the secret of preparing the ore for the furnace, he had refused to give information as to the manner of working it,—the Ráná thereon tried to burn a little himself, but all his crucibles broke.

6th. A few days afterwards on my visiting Jáwar, the old man came and at my request brought a basket of the ore in its rough state. He described it as being found in veins 3 or 4 inches thick and sometimes in bunches, in quartz rock and mixed with other stone. He broke some pieces with a hammer, showing me the good ore and the simple way it was freed from the quartz rock, with which it was mixed (specimens of good ore, inferior ore, and ore mixed with quartz, are sent). The pure ore being very friable is then pounded and freed from quartz and placed in crucibles some 8 or 9 inches high and 3 inches diameter; with necks 6 inches long and half an inch in diameter. The mouth being fastened up, the crucibles are inverted and placed in rows on a charcoal furnace when the ore is fused in about 3 or 4 hours. If pieces of the quartz are allowed to remain with the ore, the crucibles of course break, and hence, the old man informed me, the Ráná's failure. From each crucible the quantity of metal collected does not vary much, a specimen of that extracted for the Ráná from one crucible is sent, as are also remains of ancient crucibles found among the ruins.

7th. I could not discover whether any flux was used in the smelting, or whether the crucibles are entirely or only partially filled previous to the operation.

8th. The above is the description of the process given by the old man. I have only to add, that not pretending to be a geologist, I will not hamper with crude suppositions the opinions of those to whom the Society may make over the specimens for analysis. I am fully satisfied with having brought the mines to light, and I have only to request that, as I see no daily paper, you would oblige me by favouring me with a copy of whatever information may be elicited on the subject of the metal or the ore. It is very probable that with the immense import of all kinds of metals from England, the working of these ancient mines may not now be profitable, still the subject is itself interesting, as bringing to notice another part of India in which mineral riches abound.

Description of a new species of Mole (Talpa leucura, Blyth).

By Ed. Blyth, *Esq.*

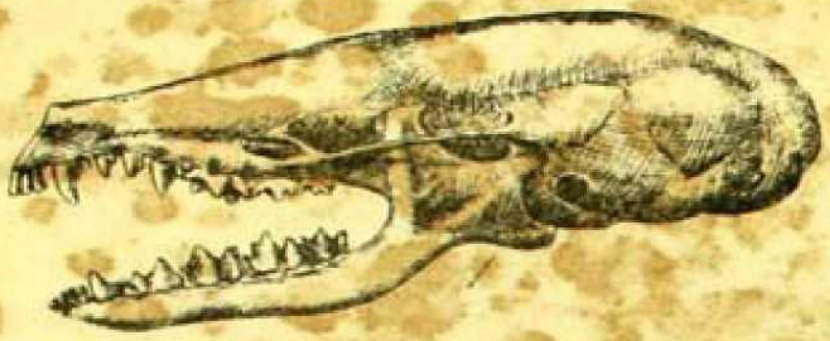
The species of restricted *Talpa* that have hitherto been described amount to four only in number, that I am aware of; viz. *T. europæa*, L., of Europe generally,—*T. cæca*, Savi, of Italy and Greece,—*T. moogura*, Temminck, of Japan,—and *T. microura*, Hodgson, of Nepal, Sikim, Butan, and the mountains of Asám: but the Society's Museum has long possessed specimens of another from Cherra Punji, (N. of Sylhet), which I have recognised as distinct for some years, but now only proceed to describe.

In its external characters, the Cherra Punji Mole differs little from *T. microura*, except that the tail is considerably more developed, though much less so than in *T. europæa*; and the latter is clad and tufted with white hairs, whence I propose for the species the name of *T. leucura*. This animal, also, would seem hardly to attain the size of *T. microura*. An adult female in spirit measures $4\frac{1}{4}$ inch. long, with tail $\frac{3}{8}$ inch additional: the latter is of a club shape, much constricted for the basal half, as represented in one of the accompanying drawings. The general colour of the fur, too, is less fulvescent than is usual with *T. microura*. In both of these Asiatic species, as in *T. cæca*, there is no perforation of the integument over the eye, as in *T. europæa*; the skin being there merely attenuated and imperfectly transparent.

But the characteristic distinction of *T. leucura* consists in having only two small præmolars in the upper jaw anterior to the great last præmolar (*carnassiez*, or 'scissor-tooth'); both *T. europæa* and *T. microura* having three,—these being comparatively larger and less separated in the latter, and the *carnassiez* is also much larger in *T. microura* than in *T. europæa*. The posterior spur of the canine (? or *pseudo-canine**) is remarkably developed in *T. leucura*, in place of the absent small præmolar. In the dentition of the lower jaw, there are also characteristic differences distinguishing these three species. In the Moles, as in most other *Insectivora*, and also in the *Lemuridæ* (the very peculiar genus *Cheiromys*, which has rodential tusks, excepted), the lower canine is minute and takes the form of an incisor, for which it has been very commonly mistaken ;† and the first præmolar is developed to assume the form of a canine, but locks *posteriorly* to the upper canine (or pseudo-canine, and like it has a double fang). There is no instance of a genuine lower canine locking behind the upper one, unless the gnawing tusks of the *Rodentia* and of the Lemuridous *Cheiromys* be regarded as the homologues of canines, which seems to be indicated more by the co-presence of undoubted upper incisors in the *Leporidæ*, than the reverse is by the difficulty of always tracing the origin of upper rodential tusks through the intermaxillaries to the true maxillary bones in the rodents generally. But to return to *Talpa leucura :* following the minute lower canine and the canine-like first lower præmolar of this species, there are two small præmolars anterior to the *carnassiez* or last of the series, and the first of these is conspicuously much smaller than the second ; in *T. microura* the two are of equal or nearly equal size, and occupy more space longitudinally ; while in *T. europæa* these and the *carnassiez* successively enlarge in a regular gradation, the latter being proportionally smaller

* In all the *Insectivora*, Cuv., which apparently possess upper canines, these teeth have rather the structure of *modified false molars*, and, I believe, have always double fangs, as exemplified by *Talpa*, *Centetes*, and *Gymnura*. I figure the upper pseudo-canine of *Talpa europæa* extracted from its socket, by way of illustration.

† No placental mammal has more than three pairs of true incisors, or than three pairs of true molars (distinguished by their not being preceded by deciduary teeth in the young animal, as is the case with all other teeth). Although certain instances occur, as especially in the hoofed ruminants, where the lower canine is hardly (if at all) to be distinguished from the incisors, yet this fourth supposed pair of incisors never co-exists with an undoubted canine (vide the Camels, Horses, Tapirs, &c.), that is among the *placental* mammalia, inasmuch as they are the veritable homologues of those teeth.





2



3



3a



1a

than in the two Indian species. Both scissor-teeth are indeed most developed in *T. microura*, and the teeth generally are more robust.

The specimens of *T. microura* from Asám, like those of Nepal, have generally a very minute tail, which can at least be distinctly enough felt under the fur; but those from the vicinity of Darjiling have no external trace of tail, whether sent as skins or in spirit. I have found, however, no perceptible difference in the skulls and dentition, nor in any other character whatever, that should warrant us in considering the tail-less Darjiling Moles as a distinct species, separable from *T. microura*. The Society's museum contains *T. leucura* stuffed and in spirit, and the skull of the specimen preserved in spirit has been extracted and cleaned; while the dentition of the stuffed specimen is exposed, and is quite similar to that of the other here described. It is not improbable that *T. leucura* may extend its range eastward into China; and in that direction we may look for additional species of *Talpa*, if not also in western Asia. In Africa the genus is unknown, but is represented in the south by *Chrysochlore*; in N. America by *Scalops* and *Condylura*; while in S. America the *Insectivora*, Cuv., do not occur, their functions being performed by numerous diminutive species of *Didelphys*, as also may be said in Australia by the *Perameles* tribe; and it is far from unlikely that Australia may yet be found to produce a fossorial marsupial form, resembling the Moles as other *Marsupialia* present an analogical but superficial likeness to certain other *Insectivora*.

Explanation of plate. Skulls of the genus *Talpa*, magnified to twice the natural size.—1, *T. leucura*—2. *T. microura*.—3. *T. europæa*.—1, *a*. Tail of *T. leucura*, nat. size.—3, *a*. Upper pseudo-canine of *T. europæa*, magnified.

Note on the Formations and Lead Mines of Kohel et Teráfeh, Eastern desert of Egypt, by Hekekyan Bey. *Communicated by Captain* T. J. Newbold, *F. R. S., Foreign Member of the Philomathique and Geological Societies of France.*

Note.—The old Lead Mines of *Kohel* lie near the Red Sea, a day's journey N. by E. from *Gebel Zubára*, in about Lat. 24° 40′. Not far distant are the Lead Mines of *Gebel Rassás*, (*lit.* mountain of lead.)

The use of lead was known at an early epoch in the history of Metallurgy. Mention of it is made by Moses in his song of triumph

and thanksgiving, after the passage of the Red Sea and the overthrow of Pharoah and the Egyptian host in its waters. ["Thou didst blow with thy wind, the sea covered them: they sank as lead in the mighty waters." Ex. xv. 10.] Again in Numbers xxxi. 22,—where it is mentioned with the other five metals most in use at this early period: ("only the gold, and the silver, the brass, the iron, the tin, and the lead.") Job thus alludes to the use of lead for the permanent record of remarkable transactions, (xix. 23, 24.) "Oh, that my words were now written! Oh, that they were printed (written?) in a book! that they were graven with an iron pen and lead in the rock for ever!" Again in Jeremiah vi. 29. "The bellows are burned, the lead is consumed of the fire, the founder melteth in vain." According to the following passage in Ezekiel, by whom this metal is mentioned more than once, it would seem to have been imported into Palestine by merchants from Tarshish (xxvii. 12.) "Tarshish was thy merchant by reason of the multitude of all kind of riches; with silver, iron, tin, and lead, they traded in thy fairs." In the time of Zechariah lead appears to have been used for the sealing up and covering of vessels. (v. 8.) "And he cast it into the midst of the ephah; and he cast the weight of lead upon the mouth thereof."

Pausanias speaks of certain books of Hesiod, written upon sheets of lead, and Pliny states, that public acts were registered on leaves of the same metal. A great number of leaden coins, most of them Greek or Roman, but some representing Egyptian divinities, have been figured by Ficorini in his *Piombi Antichi;* and frequent allusion is made to leaden coins by the poets.

The ancient Egyptians made use of lead chiefly in their alloys, and for solder.

An ancient *Sistrum* found by Mr. Burton at Thebes is soldered with lead: and I have seen portions of this metal still adhering to cavities in hewn stones in some of the temple walls at Thebes.

The lead appeared to have been used for fastening bars of bronze or iron into the blocks. The bars have disappeared, but have left their traces in a few places, in stains of rust or verdigris. According to Diodorus lead was employed by the Egyptians in purifying the gold dust, found on the confines of Egypt, which he tells us (iii. 11.) was placed with a fixed proportion of lead, salt, a little tin, and barley bran into earthern crucibles closed with clay, and exposed to heat in a fur-

nace, for five successive days and nights. Lead (galena) is not only found at the old excavations of *Kohel et Teráfeh*, but in several other places in the eastern desert of Egypt, generally in short veins and nests, in the limestone, as at Wadi Araba, and the Mokattern. Old lead mines are said to exist at *Gebel Rassás*, as before observed.

T. J. N.

Formation around Kohel et Teráfeh.

Note.—The beds in this section are taken in the ascending order commencing with the lowest. T. J. N.

The formation in the plain *(fersh)* towards the N. W. of the *Kohel* is composed of parallel layers of coarse, yellow, compact psammite, a foot in thickness—succeeded by a layer, 4 or 5 inches thick, containing rolled pebbles of quartz, porphyry, granite, gneiss, &c. Seams of crystallised sulphate of lime intercalate these layers; and thin laminæ of the same matter branch through them vertically. Over them we have several beds of yellow psammite tinged with red, and containing nodules of oxidulated iron; each bed averaging from 1½ feet to 2 feet, in thickness. Several thin layers of gypsum, with intervening clays and ferruginous psammites—about four inches thick in the aggregate, and a layer, about eight inches thick, of calcareous sandstone—very compact and hard—containing silicified bivalves in good preservation, succeed.

Overlying them is a series of light green and streaked psammites of a less compact structure than the inferior beds—each layer is separated from the other by an intervening seam of gypsum—about one, or one and a half inch thick.

Over these chloritic psammites we have a close arrangement of parallel bands of gypsum, with intervening layers of disintegrated clay (?) about twelve inches thick. Above them lies stratified sulphate of lime of a compact nature from twenty to twenty-five feet thick, with about seven or eight feet of a less compact sulphate of lime overlying it. Above the sulphates of lime we have a layer of corals: and over the corals a diluvium composed of a dark yellowish marl; on which reposes a gravel of sharp angular fragments of granitic and felspathic formations; some of the fragments are a cubic foot in size;

and a few of the larger blocks are slightly rounded. This diluvium covers the surface of this part of the *Kohel.**

The strata of the *Kohel* hill here have a very slight easterly dip. The surface of the ravines passing through it, are inclined in a similar direction, but at a greater angle.

Lead Mines of Kohel et Teráfeh.

The mines are situated about 1½ mile from the W. shore of the Red Sea, as before observed. The ore, galena and carbonate of lead, occurs in an argillo-siliceous schist, associated with small quantities of sulphur and iron—a poor carbonate. The Bey visited seven excavations, which are mostly from three to four feet broad, about five feet high, and run down in inclined planes cut in steps. Galena was found in the shaft worked by Brochi; but the indications discovered are not considered favourable. Besides other minerals, titaniated iron, manganese, zinc and fire-clay have been discovered here. The surface of the rock between the mines and the shore is coral limestone, covered with a gravel of granitic, gneiss, porphyry pebbles.

The mines were worked by the ancients: and the ruins of an old, but not extensive station still exist, in detached buildings of loose stones and foundations—some round,—others square. Water is brought from Gebel *Egleh, or Edjleh*—four or five hours' distance, but is bad, brackish, and causes vomiting.

The *fersh* of the *Kohel* produces a good deal of *Siyál wood, (Acacia Siyáleh.)*

From the mines the Bey took a S. W. direction by *Wádis Egli* and *Sakkari Siyáleh*, and after a day's march arrived at *Wádis Allem* and *Zubára*. In Wádi Túmtúbah are Hieroglyphs and a Zodiac, sculptured on some porphyro-felspathic rocks associated with gneiss, schists, and quartz, containing much argillaceous matter. At *Zubára* the principal rock is a ferruginous mica schist with quartz veins, containing bits of emerald. Grey granite, with silvery mica, micaceous amphibole, black steatite, and nodules of iron, occurs, also gneiss.

* The site of the granites, porphyries and felspars composing the "diluvium," is not far off, as the Bey has a note of having passed some felspathic and granite hills with quartz, invaded by porphyry and serpentine, the day before he reached the Kohel. These plutonic rocks lie westerly from the *Kohel*, and continue two days' journey in a N. W. direction, forming the *Kabarais* hills. The *Tell-t-el Kabarais* has a reservoir containing twelve months water. At *Wádi el Assel*, N. E. from Kosseir, and Wádi Hinduseh, they become intermingled with the sedimentary rocks, limestone and sandstone. At *Wádi Zúg el Bahar* two chains of marly limestone, chalk and psammites occur, overtopped by higher, and isolated clusters of felspathic rocks.

Remarks on the modes of variation of nearly affined species or races of Birds, chiefly inhabitants of India.—*By* E. Blyth.

The drawing up of a catalogue of species of any class of animals involves a series of decisions as to what are to be considered species or merely varieties of the same species, in all of which decisions no two zoologists will be found to agree, inasmuch as in numerous cases of difficulty such decisions become quite arbitrary. The fact is, we find every variety of gradation from a similitude which does not permit of a distinction being made, to an amount of discrepancy which all would agree in regarding as of specifical import. As species are often represented (I do not use this word in reference to a *system* of representation, in which I do not believe,) in distant countries by others bearing a greater or less resemblance to them, in some cases so close as scarcely to permit of discrimination, so there may be others having equal claim to be regarded as of distinct origin, even though utterly undistinguishable apart. Or a particular age or sex only may present some marked diversity, as instanced by the caterpillars of certain lepidopterous insects which are hardly, if at all, to be separately recognised in the *imago* phase of their existence. Mr. Swainson collected in Brazil specimens of a butterfly, *Papilio (Podalirius) nomius*, figured in his 'Zoological Illustrations,' which would hardly be supposed to inhabit likewise Lower Bengal; yet a species which, so far as can be judged from his very careful representation, is absolutely similar, abounds in the vicinity of Calcutta and other parts of Bengal during the dry hot season. It is true that we also get here the *Cynthia cardui*, which is a butterfly of almost universal distribution, alike in the British islands, America, and Australia:* but it does not appear that *Papilio nomius* has been observed elsewhere than in India and Brazil, and we can hardly suppose its race to have been conveyed from one of these countries to the other, or to have reached them both from a common point of divergence.

* We have compared specimens from Calcutta, Central India, the E. and W. Himalaya, and Afghanistan, with others from Europe and W. Australia, and could detect no distinctive character whatever.

Races deviate from the similarity which obtains among different individuals of the same race, in every way in which a difference could well be exhibited. Thus some differ only in size, as the greater and less European Bullfinches (of which the former is, we believe, the true *Loxia pyrrhula*, L.,)—the *Turtur orientalis* and *T. auritus*,—the *Charadrius pluvialis* and *Ch. virginicus*,—the *Larus glaucus* and *L. islandicus*,—the Asiatic *Nettapus coromandelianus* and the Australian *N. bicolor*, Lesson,—*Buceros affinis* of the Deyra Doon and *B. albirostris*,—*Alcedo ispida* and *A. bengalensis*,—*Caprimulgus ruficollis* and *C. asiaticus*,—*C. monticolus* and *C. affinis*,—*Enicurus frontalis*, nobis, of the Malayan Peninsula and *E. speciosus* (Horsfield), of Java, —*Sylvia Jerdoni*, nobis, and *S. curruca*, (Gm.) both Indian birds,—*Cuculus canorus*, *C. himalayanus*, and *C. poliocephalus*, which are alike inhabitants of the Himalaya, &c. &c.

Or, with exact similarity of size and proportions, they may differ more or less in colour,—as the different species of Asiatic *Treron* with yellow feet, *e. g. Tr. phœnicoptera* of Bengal and Upper India, *Tr. chlorigaster* of S. India and Ceylon, and *Tr. viridifrons* of Burma; or the long-tailed *Tr. apicauda* of the S. E. Himalaya and *Tr. oxyura* of the Malay countries:—also the species or races of black-headed *Munia*, as *M. sinensis* of the Malayan peninsula, *M. rubroniger* of Bengal, Nepal, Asám, Arakan, and Tenasserim, and *M. malacca* of S. India and Ceylon. Such differences may be very slight indeed and yet constant, as in the foregoing instances and many more:—such as *Carpophaga ænea* of the Nicobar Islands as compared with specimens from the neighbouring countries,—*Palumbus Elphinstonei* of the Nilgiris and of Ceylon—*Orthotomus melanocephalus* of Malabar and Ceylon and that of Bengal, Nepal, and the countries eastward,—*Pomatorhinus erythrogenys* of the N. W. and of the S. E. Himalaya,—*Caccabis chukar* and *C. græca*, auctorum,—the *Cyaneculæ*, the *Geocichlæ*, &c.; among which may be further enumerated the common Sparrows of India and of Europe, and the *Accentor alpinus* of the mountains of Europe and *A. nipalensis* of the Himalaya. The *Garrulus glandarius*, *G. melanocephalus*, and the Japanese Jay,—the *Sitta europæa*, *S. cæsia*, and *S. himalayensis*,—and the bare-necked white Ibises *(Threskiornis)* of India, Africa, and Australia, afford other characteristic examples.

In several such cases where the sexes differ, the adult males only of two or more races can be distinguished, as exemplified by *Thamnobia cambaiensis* of N. and Middle India and *Th. fulicata* of S. India and Ceylon,—also by some of the Indian long-tailed *Nectariniæ*,—by *Tephrodornis pelvica* and *T. sylvicola*,—by certain of the *Kallij* Pheasants *(Gallophasis)*, and of the Tree Partridges (*Arboricola*). Or only the *older* males may assume a distinguishing mark, as in *Lanius superciliosus* of the Malay countries as compared with its representative in India. Or perhaps the old of both sexes may alone be distinguishable, as instanced by the amethystine *Chrysococcyx xanthorhynchos* of the Malay countries and its emerald-green Indian representative. Lastly, the nuptial plumage may alone present a constant diversity, which is very great in *Motacilla alboides* and *M. dukhunensis;* and we should infer that *Hydrochelidon leucopareia* so common in India, and *H. fluviatilis*, Gould, of Australia, were not to be known apart in their non-breeding livery.

That we should not be too hasty in setting down these slight and apparently trivial differences as denoting varieties only of the same particular species, is indicated by the fact that with a constant variation of colour, however seemingly unimportant, is sometimes, if not commonly, associated a marked difference in the voice. This is very decided in the case of *Pratincola indica*, nobis, as compared with that of the European *Pr. rubicola;* the wild *Turtur risorius*, (L.) of India has also a very different voice (or *coo*) from the domesticated Dove so common in cages and called by the same name: and we should expect that the three Cuckoos before referred to will prove to differ remarkably in voice; while (so far as we can learn) the *Dendronanthus agilis* of India never emits the fine musical notes of the very closely affined *D. trivialis*. How excellent a criterion is furnished, in some cases at least, by the voice is illustrated by the multifarious breeds of the common domestic fowl, all of which speak the same language, which is a very different one, in every note uttered, from that either of the wild *Gallus Sonneratii* of S. India, or *G. Stanleyi* of Ceylon. But a more conclusive proof, that exceedingly close external resemblance may subsist when the species are unquestionably diverse, is deduceable from the fact of the very extraordinary conformation of

the trachea in the female alone of *Rhynchea australis*, which peculiarity does not occur in either sex of *Rh. bengalensis*.

Following up this enumeration of the variety of modes of differing among closely affined races of birds, it may next be remarked that a great difference of voice and of habits may be only indicated in the structure by minute variations in the form of particular feathers; *e. g. Corvus corone* and *C. americanus*:—*Pernis cristata* is only distinguished from *P. apivora* by an occipital tuft of lengthened feathers more or less developed, in addition to its different habitat; and in *Spizaëtus limnaëtus* and *Sp. cristatellus*, the last named has a similar occipital crest generally much more developed, this being again the chief distinction besides that of geographical distribution, and that the former race assumes an ultimate phase of plumage which is never (so far as we can learn) seen in the other. The very different form of the crest and adjacent plumage is again the only distinction we are acquainted with between the larger Indian Pelican (*Pelicanus javanicus*) and the closely affined African species (*P. onocrotalus*). In many other instances the distinction is best shewn in the varying relative proportions of the wing-primaries, or even in that of a single primary, as exemplified by *Acrocephalus arundinaceus*, (L., vel *Sylvia turdoides*, Tem.,) of Europe, and *Acr. brunnescens*, (Jerdon,) of India.* *Pycnonotus jocosus* of Burma and Penang has always a shorter and more intensely crimson ear-tuft than *P. jocosus* of India, and we have been assured that the voices also differ. The *Irena puella* of India, and also of Arakan and the Tenasserim provinces, differs constantly from that of the Malay countries by having shorter tail-coverts.

Then we have cases in which sundry of the foregoing differences are variously combined. In *Loxia himalayensis*, *L. curvirostra*, and *L. pytiopsittacus*, the size is successively larger, with a successively more robust conformation. So likewise in *Gracula javanensis* and *Gr. intermedia*. The restricted *Edolii* differ slightly in size only, except that the larger have successively the frontal crest proportionally more developed. In *Cannabis linaria* (*Fringilla linaria*, L., v. *Linaria canescens*, Gould), as compared with *C. minor*, a difference of size is combined with a very slight one of plumage, and the song-notes are here again distinguishable. In *Pratincola atrata*, nobis, of the high-

* Vide *J. A. S.* XV., 288.

lands of Ceylon, as compared with *Pr. caprata*, a larger size is combined with a proportionally larger bill. The same is more strongly shewn in *Garrulax pectoralis* as compared with *G. moniliger*, and in *Hiaticula Geoffroyi* as compared with *H. Leschenaultii*; the plumage, and the seasonal changes of plumage of the two last named species, being absolutely alike. *Emberiza palustris* would resemble *Emb. schæniculus*, only that the beak is altogether of a different shape. So with *Montifringilla nivalis* and *Plectrophanes nivalis*, all the difference is in the bill (so far as we can remember). *Treron curvirostris* and *Tr. malabaricus* are alike in size and plumage, but their bills are of a very different form, and there is a bare space surrounding the eye of the one and not of the other. *Pomatorhinus schisticeps* resembles in plumage *P. leucogaster*, but has a larger bill and much more developed and straighter claws. *Calornis affinis*, nobis (*Turdus columbinus?* Gmelin), has merely a larger size and generally duller plumage than *C. cantor*. It is easy to multiply examples, grading from absolute similarity to the exhibition of every amount and variety of dissemblance.

In some instances where slight differences of colour only, especially of shade of hue, constitute the sole diversity, we have the presumptive evidence afforded by a series of many analogous cases, subject to the same conditions of climate, &c., manifesting the same phænomenon, which is therefore to be ascribed with the greater probability to the operation of a cause inducing the particular variation. Thus several Indian birds are much darker and more intensely coloured in Ceylon; —*e. g. Corvus splendens*, *Acridotheres tristis*, and the female of *Copsychus saularis*: *Dicrurus leucopygialis* of Ceylon thus differs from *D. cærulescens* of India in having only the vent and lower tail-coverts white.* *Pomatorhinus melanurus* of Ceylon has the colours more fully brought out, as compared with *P. Horsfieldi* of peninsular India. *Palumbus Elphinstonei* of Ceylon wants the ruddy margins of the dorsal feathers seen in the corresponding race of the Nilgiris. *Lori-*

* *Dicrurus longicaudatus* of Ceylon quite resembles that of India; whereas *D. macrocercus* of that island is constantly smaller. On the other hand, *D. macrocercus* is undistinguishable in India, Burma, and Java, while in Burma *D. longicaudatus* is replaced by the smaller but otherwise similar *D. intermedius*, nobis. The small Ceylon race of *D. macrocercus* I have elsewhere termed *D. minor*.

culus asiaticus, (Lath., v. *indicus*, Gmelin,) differs only from *L. vernalis* of India, Burma, and Java, in having the crown deep red, with an inclination to greater variation of hue on other parts. *Hirundo hyperythra* of Ceylon, as compared with *H. daurica*, (like *H. cahirica* as compared with *H. rustica*,) differs only in having the entire underparts very deep ferruginous. *Megalaima zeylonica* of Ceylon is merely smaller than *M. caniceps* of India, with the lower parts decidedly darker; and the Cinghalese representative of the rufous or bay Woodpeckers *(Micropternus)* is much deeper-coloured than those respectively of S. India, Bengal, and the Malay countries. On the other hand, *Halcyon gurial* of Ceylon perfectly resembles that of India generally and of Burma, whereas the Malayan race (*H. leucocephalus*,) is smaller and of deeper hue with a coloured shine on the crown. So, also, *Orthotomus longicauda* is deeper-coloured in the Malayan peninsula than in India, but not so in Ceylon. In general, the Malayan species, unless obviously distinct, present no difference of shade from those of India and other countries to the northward; and the only additional instances we can call to mind of their being thus distinguished are those of *Trichastoma olivaceum* of the Malayan peninsula as compared with *Tr. Abbotti* of Arakan,—*Megalaima trimaculata* and *M. cyanotis* of the same countries respectively,—and *Picus moluccensis* and *P. canicapillus*, ditto:* the Tenasserim Hoopoe is very deep-coloured in comparison with that of Arakan, Bengal, and Europe, and seen sometimes in the Nilgiris; but the ordinary Hoopoe of S. India and Ceylon is smaller with the exception of its beak, and likewise rather deep-coloured.† The common Jungle-cock *(Gallus ferrugineus)* is again deeper-coloured in the Malayan peninsula and archipelago, besides being coarser in the leg, and wanting the conspicuous pure white cheek-lappet which so ornaments the Bengal Jungle-fowl. Also (so far as I have seen), the Malayan *Pavo muticus* is far more vividly coloured than that of Arakan; the latter being comparatively much darker. But we can neither generalize upon these facts, so as to predicate the like in other instances, inasmuch as the majority of species common to India and Ceylon or to India and the Malay countries do not appear to vary in the least degree, nor can we draw the dividing line as to what can be satisfactorily considered

* *Megalaima cyanotis* and *Picus canicapillus* inhabit also the Tenasserim provinces.

† I have never seen a Hoopoe from the Malayan peninsula.

species, as the gradations continue unbroken to the most marked specific types, and which still may hold a parallel in the respective regions, as the peculiar Jungle-fowl and Spur-fowl (*Galloperdix*) of Ceylon, as compared with their Indian congeners, may suffice to testify.

In poleward or very elevated regions we remark the contrary tendency of animals, to become paler in colour, whether particular species or evident varieties of those which inhabit elsewhere. For example, the Tibetan fauna generally would seem to exemplify this law; and several of the birds of Scandinavia as compared with those of Britain are deficient in colour, greys passing into white, and fulvous into white or grey. The only difference between *Sitta europæa*, L. (vel *S. asiatica* and *sericea*, Temminck, and *S. uralensis*, Lichtenstein,) of Scandinavia and the northernmost parts of Europe generally, from *S. cæsia* of the rest of Europe, consists in the lower parts of the former being pure white where those of the latter are pale fulvous; and in *S. cinnamoventris* of the Himalaya, again, the only difference consists in the same parts being altogether of the deep and dark ferruginous which is confined to the flanks and lower tail-coverts only of the two preceding races. *Picus minor* and *Parus ater* and *P. palustris* of Scandinavia are thus readily distinguished from the corresponding races of Britain: and it is curious that *Orites caudatus* of the N. of Europe would appear to have invariably a pure white head, devoid of the dark sincipital bands which occur constantly upon this species in Britain.

There is yet another phænomenon which adds to the difficulty of discriminating species in some, though not many, instances; and this is the production of hybrid races and individuals of mixed origin of every grade of intermediateness. In some cases the hybrids are not known to reproduce, and so to form a race, as instanced by the mule grouse of Northern Europe (the cross between the Capercailzie and the Black Grouse), together with other hybrids produced by sundry wild *Gallinaceæ* and *Anatidæ*: but there are some hybrids which are quite as prolific as their parents, as among mammalia those raised between the humped and humpless domestic cattle, and among domestic birds the mixed progeny of *Anser cinereus* and *A. cygnoides*.* So in the

* All the domestic Geese of India (so far as I have seen) are of this mixed species, and in no animals can specifical characters be more strongly marked than in the parent races, extending to the voice and habits. So with the cattle,—the

Himalaya and elsewhere the different races or species of *Kallij* Pheasants inter-breed, and the hybrids so produced again both *inter se* and with the pure parent races, whence every gradation from one to another may be traced in a series of specimens.* And the same is shewn with *Coracias indica* of India generally and *C. affinis* of the countries eastward, to the extent that in some districts it is difficult to procure either with quite the typical colouring; but we are not aware that the same happens in Sindh and its vicinity, with regard to *C. indica* and the equally affined *C. garrula*, which latter European species is there not uncommon. I know of no other decided intermixture of wild races of birds in India, though I have seen some reason to suspect it in the instance of *Treron phœnicoptera* and *Tr. chlorigaster;* and perhaps also *Iora typhia* and *I. zeylanica:* as regards the latter at least, we occasionally obtain specimens in Bengal that had imperfectly assumed the black cap and dorsal plumage so constant in the old males of S. India and Ceylon, but I never saw this dress approaching to perfection in a Bengal specimen, and it may be an instance of climatal variation which gradually attains its ultimatum as we proceed southward in the Indian peninsula and Ceylon, though not in the corresponding and lower latitudes of the Malayan peninsula. There we have a remarkably different colouring in the male *I. scapularis*, Horsfield, which again is however a darkening of hue, though quite in a different way; and it remains to observe whether a gradation exists in the latter instance as in the former. The three exactly accord in size and structure, as in so many corresponding instances; but another and much larger *Iora* inhabits the whole eastern side of the Bay of Bengal, the male of which is *I. Lafresnayei*, Hartlaub, and the female was subsequently named by me *I. innotata*.

These remarks have been thrown together preparatory to the draw-

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hump is only one distinction out of very many, but is nevertheless so characteristic of the animal as to be well exhibited at an early period of fœtal life; and the voice is again very different, and the habits in various particulars, especially in the fact of the European cattle seeking shade and water in hot weather, whereas the humped cattle seem indifferent to the hottest Indian sun, and never seek water to stand knee and belly deep for hours, as so beautifully pictured of the humpless race by the author of the 'Seasons.'

* This is well shewn in the Society's Museum. Vide *J. A. S.* XVIII., 817.

ing up of a list of all the birds of India, Burma, and the Malayan peninsula, with those of Sindh, Asám, Ceylon, the Nicobars, &c. (so far as I am able), in which I propose to offer such observations on the affinities of many of the species or races as may enable the student to draw his own conclusions respecting their claims to be regarded as species or as mere varieties. A bare list of names, especially if unaccompanied by synonymes, is oftentimes of little or no utility whatever as a guide, or even worse so often as mistakes in the determination of species occur, or those of the rarest and most casual occurrence are set down without a word of remark together with the commonest and most generally diffused. Where a constant variation, however trivial, obtains, it should be duly noted, and the value that the particular writer attaches to it is of small consequence: and it should likewise be distinguished whether the author writes from his personal knowledge or from the observations of others, if any authority is to attach to his production.

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*Conspectus of the Ornithology of India, Burma, and the Malayan peninsula, inclusive of Sindh, Asám, Ceylon, and the Nicobar islands.** —*By* E. Blyth, *Esq.*

Order I. SCANSORES.

Fam. PSITTACIDÆ.

Subfam. ARINÆ.†

Genus Palæornis, Vigors.

Totá, Sugá, Hind.: *Tiyá,* Beng.: *Girawa,* or *Rana Girawa,* Cingh.: *Kyet-ta-rwe,* Arakan.

* The Andamans, with the Maldives and Laccadives, would also have been added, had more information been available respecting this branch of their fauna.

† The Parrot family divides naturally into five sub-families, of which the second and last are the most strongly characterized by peculiarities of structure.

1. Cacatuinæ (or Cockatoo group). Comprising the genera *Dasyptilus (?), Microglossum, Calyptorhynchus, Cacatua, Nestor,* and *Strigops* (with sub-divisions of the third and fourth). The first and second of these are peculiar to the Papuan islands. The third also occurs in N. Guinea, but is chiefly developed in Australia with Tasmania. The fourth inhabits (in different species) Australia, Papua, the Philip-

1. P. Alexandri (Edwards, pl. 292).

Syn. *Psittacus Alexandri*, L.
Ps. eupatria, L.
Psittaca ginginiana, Brisson. } the female.
Psittacus guinneensis, Scopoli (nec *guineensis*, Gmelin).
Ps. Sonneratii, Gmelin.
Palæornis nipalensis, Hodgson, *As. Res.* XIX. 177.

pines, Moluccas, and Borneo. The fifth very recently comprised two species, one in N. Zealand, the other—already extinct—in the islet called Philip island near Norfolk island (the fauna and flora of which islands ally them chiefly with N. Zealand). The sixth, consisting of but one known species rapidly verging upon extinction (the crepuscular and Owl-like *Strigops habroptilus*, G. R. Gray), is also a N. Zealander.

2. Platycercinæ (or ground Parrakeets). Inhabiting N. Holland, with a few outlying species of *Platycercus* only in N. Zealand and Polynesia proper, and one *Aprosmictus* extending its range to N. Guinea. This group is nearly affined to the preceding one, but has a remarkable structural distinction from all other birds in the absence of bony clavicles, which in the rest of the *Psittacidæ* (as in almost throughout the class) are united to form the *furcula* or "merry-thought" bone. The members of both of these sub-families are mainly eaters of grain and other farinaceous seeds, but some of the Cockatoos feed also largely on bulbs, and the *Calyptorhynchi* partly on large insect larvæ.

3. Arinæ (or Maccaw group). Chiefly S. American, one small species only occurring in the proximate regions of N. America; but with a subordinate division in S. E. Asia and its archipelago, Africa, and Australia, comprising the genera *Palæornis*, *Tanygnathus*, and *Agapornis*, with *Prioniturus* (which would seem to be intermediate to the first and second), in the former regions, and *Polytelis* in the last named. This eastern subgroup is less frugivorous than the western; and all would appear to be birds of vigorous flight, an attribute in which the whole family has been supposed deficient.

4. Psittacinæ (or ordinary Parrots). Chiefly S. American, with a few species in Africa and Madagascar, and a particular division comprehending *Eclectus* and *Loriculus* in S. E. Asia and its archipelago. *N. B.* This and the foregoing group are affined, and the species are, in general, much more frugivorous than the members of the two preceding subfamilies, and the *Psittacinæ* more so than the *Arinæ*; but the great majority feed also on hard grain.

5. Loriinæ (or Lories). Peculiar to the Austral-asian archipelago, with Papua, Australia, and Polynesia. This subfamily is particularly distinguished by the peculiar structure of the tongue (varying somewhat in different genera), which is adapted for extracting the nectar from flowers; the species also feed upon soft fruits, but never on grain, and the beak is proportionally feeble.

Chandaná ('Sandal-wood coloured,' alluding to the yellowish tinge of the under parts and upper portion of the back), Beng.: *Karan sugá* and *Kararia* of Nepal (Hodgson): *Ráé Totá* ('Royal Parrakeet'), Hind. (Jerdon): *Kyai Phoungka*, Arakan (Phayre).

Hab. Hilly regions of all India proper, from the sub-Himalayas to Ceylon inclusive; Asám; Sylhet; Arakan; Tenasserim provinces.

2. P. torquatus (Daubenton's *Pl. Enl.* 551).

Syn. *Psittaca torquata*, Brisson.

Psittacus Alexandri, var. B, Latham.*

Ps. cubicularis, Hasselquist.

Ps. docilis, Vieillot.

Ps. steptophorus, Desmarest.

Var. *Sulphur Parrakeet*, Shaw.

Tiyá (or *Teeyá*, imitative of voice), Hind.: *Tent'hia Suga*, Nepal (Hodgson): *Gallar* of some, H.: *Lybar*, Masuri (Hutton): *Lybar Totá*, S. India (Jerdon): *Kyai-gyot*, Arakan (Phayre).

Hab. Plains of India; Ceylon; Asám; Sylhet; Arakan; Tenasserim provinces; Malayan peninsula (to latitude of Penang): W. Africa (apud Swainson), smaller variety.†

In general, the *Psittacidæ* are exclusively vegetable-feeders, as much so as the *Columbidæ*: but the *Calyptorhynchi* are described to cut up decaying trees, by means of their extremely powerful beaks, to get at the larvæ in the interior of the wood; and the *Loriinæ* (at least in confinement) will eat soft maggots. This general diet of the group helps to bear out the analogy which the *Psittacidæ* among birds bear to the *Quadrumana* among mammalia (though it is true that many of the *Quadrumana* are, in the wild state, far more omnivorous than is generally supposed). In their whole structure, the *Psittacidæ* manifest no particular affinity (that we can discern) for any of the zygodactyle *Insessores*; but they decidedly constitute a very distinct ordinal type, shewing most relations with the diurnal *Raptores*: and regarding them as the most highly organized of birds, we do not hesitate to follow the arrangement of those zoologists who place them at the head of the class, parallel to the Apes and Monkeys among the mammalia.

* Except that there is no patch of crimson on the wing-coverts of *Ps. torquatus*.

† "The Rose-ringed Parrakeet," writes Mr. Swainson, "is one of the few birds of Senegal whose geographic distribution extends from east to west. Of four specimens in very perfect plumage now before us, three are from Western Africa and

Remark. This is the only Indian Parrot (so far as we are aware) that affects the vicinity of human habitations, flocks of them often settling upon buildings, especially if situate in gardens with trees about them, and one or more pairs occasionally breeding in suitable cavities about buildings. It is the only species observed wild in the densely populous neighbourhood of Calcutta, but in jungle districts becomes replaced by No. 4.

3. P. SCHISTICEPS, Hodgson, *As. Res.* XIX. 178.

SYN.? *Conurus himalayanus*, Lesson, in Belanger's *Voyage*.

Mádana Sugá, Nepal (Hodgson): *Puhari Tuiya*, Masuri (Hutton): *Gágí* of Calcutta bird-dealers.

HAB. Sub-Himalayan region (exclusively).

Remark. The Masuri name of this species (or 'mountain Tuia') well expresses its near affinity for the next. The adult sexes differ in the male having a small maronne spot on the wing, which is wanting or barely indicated in the female, and the black demi-collar is also rather more developed. The young have generally but a trace of the slaty-blue cap, but this is fully developed in some few specimens, though without the black demi-collar which borders this cap in the adult. The beak, which in *P. cyanocephalus* is bright yellow, is in the present species yellow tinged with coral-red, and in adults of all the other species is bright coral-red.

4. P. CYANOCEPHALUS (Edwards, pl. 233; Daubenton's *Pl. Enl.*, 264).

SYN. *Psittacus cyanocephalus, L.*
Ps. flavitorquis, Shaw.
Ps. annulatus, Kuhl.
Palæornis flavicollaris, Franklin. } the female.
Psittaca bengalensis, Brisson.

one from Madras: between the first three of these, there is no difference whatever in size; but that from the East Indies is considerably larger; the length of its wing, in fact, measuring 7 in., while that of the Senegal race is not quite 6 in." *Birds of W. Africa*, II, 175. Of numerous Indian specimens examined, from all the above named localities, we have found the length of the wing to be very regularly 6⅛ in., rarely ¼ in. more or less.

Psittacus erythrocephalus, Gmelin.
Ps. ginginianus, Latham.
Ps. rhodocephalus, Shaw.
Var. *Ps. narcissus*, Latham (with coloured figure).
Faridi, and *Fariádi* ('plaintive'), Bengal; *Tui Sugá* (the first or specific name imitative of cry), Nepal (Hodgson); *Tuia Totá*, S. India (Jerdon); *Bengali totá*, Panjab; *Kyai-ta-ma*, Arakan (Phayre).

HAB. Upland and jungle regions of all India proper; Ceylon; Asám; Sylhet; Arakan; Tenasserim provinces. *N. B.* It occurs in open jungle, in the Bengal Sundarbans. To the westward, leaving the alluvial soil of the Ganges, it seems entirely to take the place of *P. torquatus* in the Midnapur jungles.

5. P. MALACCENSIS (Daubenton's *Pl. Enl.* 887; Levaillant, pl. 72).
SYN. *Psittacus malaccensis*, Gmelin (nec Latham).
Ps. erubescens, Shaw.
Ps. ginginianus, var. C, Latham.
Ps. barbatulatus, Bechstein.
Bayan, Sumatra (Raffles); *Madná Bhola* of the Calcutta dealers.
HAB. Malayan peninsula; Sumatra.

6. P. ERYTHROGENIS, Blyth, *J. A. S.* XV, 23, 51, 368.
HAB. This beautiful species is common in the Nicobar Islands, and does not appear to have been hitherto observed elsewhere.

7. P. CANICEPS, Blyth, *J. A. S.* XV, 23, 51.
HAB. Nicobar Islands; Malayan peninsula (latitude of Penang).
Remark. Of this fine and strongly marked species, we have seen two specimens only; one with a coral-red beak, procured alive (with its wings and tail much mutilated) from a Nicobarian savage, and which is now in the Society's Museum; the other with a black beak, from Province Wellesley.

8. P. BARBATUS (Daubenton's *Pl. Enl.* 517; Swainson's *Zool. Ill.*, 2nd series, pl. 16).
SYN. *Psittacus barbatus*, *Ps. pondicerianus*, and *Ps. borneus*, Gmelin.

Ps. bimaculatus, Sparrman.

Ps. javanicus, Osbeck.

Ps. Osbeckii, Latham.

Ps. mystaceus, Shaw.

Palæornis nigrirostris, Hodgson (the young female).

P. modestus, Fraser (the very young female).

Madná ('charming,' 'pleasing'), the red-billed bird; *Kájlá* (as having the black pigment, *Kájal*, applied to the eye-brows; alluding to the black loral line), the black-billed bird, Hind.; *Imrit Bhila*, Nepal, (Hodgson); *Bettet*, Java, (Horsfield).

Hab. Hilly parts of Bengal, Nepal, Asám, Sylhet, Arakan, Tenasserim, Malayan peninsula (to latitude of Penang), Sumatra, Java, and Borneo.

Remark. We have never seen this bird in Malacca collections, nor does it appear to occur wild in any part of the Indian peninsula or in Ceylon; hence the name *pondicerianus* cannot be adopted. Specimens from Java are perfectly similar to those of India. In a presumed female observed in captivity, the upper mandible changed from black to coral-red when the bird was about 18 months old.

9. P. columboides, Vigors (Jerdon's *Ill. Ind. Orn.*, pl. 8).

Syn. *P. melanorhynchos*, Sykes,—the young.

Madan-gowr Totá, H. (Jerdon).

Hab. Nilgiris; Malabar.

10. P. Calthrapæ, Layard, Blyth, *J. A. S.* XVIII, 800.

Hab. Mountainous interior of Ceylon.

Remark. In the adult specimen described, *loc. cit.*, the middle tail-feathers had not attained their full length: in three other adults since received, they are full grown but very short, measuring but from $4\frac{1}{2}$ in. to $5\frac{1}{2}$.*

* In this enumeration of the species of *Palæornis*, I have provisionally omitted to include a race (or slight variety of *P. torquatus?*) which inhabits Ceylon, and which I formerly supposed to be *P. bitorquatus*, Kuhl, judging from a female only which I had then reason to believe was procured in the Mauritius. Mr. Layard considers it distinct from the ordinary *P. torquatus* of Ceylon, &c., and has obligingly procured for me a living male not yet received.—Since the foregoing was in type, I have received a further communication from Mr. Layard, in which he mentions having obtained a number of skins. *P. bitorquatus*, a species which is

Genus TANYGNATHUS, Wagler.

11. T. MALACCENSIS (Swainson's *Zool. Ill.*, 1st series, pl. 154, the male? or adult of either sex?).

SYN. *Psittacus malaccensis*, Latham (nec Gmelin).

Ps. incertus, Shaw.

Tana, Malacca.

HAB. Malayan peninsula; Sumatra.

Remark. This species is essentially a small *Palæornis* with a short and sub-even tail, and is somewhat allied in its colouring to *P. columboides* and *P. Calthrapæ*, which last (as we have seen) has a shorter tail than the rest of its genus. *T. macrorhynchos*, upon which the present genus was founded, is also closely related to *Palæornis*, but upon a larger scale; and the two bear the same mutual relationship as subsists between *P. Alexandri* and *P. cyanocephalus*. Intermediate, we have *T. sumatranus*, (Raffles), and we believe *Ps. melanopterus*, Gm., and others, with the *Prioniturus setarius*, (Tem.), remarkable for the shape of its tail, which however may still be considered intermediate to those of *Tanygnathus* and *Palæornis*. In *T. sumatranus* (both sexes of which we have possessed together and studied alive), the male has a coral-red bill and the female a white bill; and the same would appear to obtain with *T. malaccensis* (if the difference of plumage in different specimens be characteristic of sex and not merely of age): and in the great *T. macrorhynchos*, the nearly affined but smaller and less powerfully billed *T. sumatranus*, and the small *T. malaccensis*, are alike perceived a peculiar yellow margining of the wing-coverts, which occurs in no species of *Palæornis*. Nearly affined again, we have the minute African and Madagascar species forming the genus *Agapornis*, to which *T. malaccensis* has by some been referred.

It remains to ascertain whether both *T. macrorhynchos* and *T. sumatranus* do not also inhabit the more elevated districts of the interior of the Malayan peninsula. In a collection which Capt. Charleton made at Malacca, there was a fine specimen of the former, but we are not aware that it was obtained wild in that vicinity, and rather doubt that either of these species occurs wild except in Borneo and to the eastward.

very little known, and is said to inhabit the island of Bourbon, is the only other *Palæornis* not included in the above list; the two Australian species being properly separated to form the genus *Polytelis*.

Subfamily. PSITTACINÆ.

Genus. LORICULUS, Blyth.

12. L. GALGULUS (Edwards, pl. 293, f. 2).

SYN. *Psittacus galgulus*, L.

Ps. pumilus, Scopoli.

Serindak, Sindada, Malacca; *Serindit*, Sumatra (Raffles).

HAB. Malayan peninsula; Sumatra.

13. L. VERNALIS (Swainson's *Zool. Ill.*, 2d series, pl. 1).

SYN. *Psittacus vernalis*, Sparrman.

Ps. galgulus apud Horsfield, *Lin. Tr.* XIII, 182.

Latkan ('pendent'), Hind., Bengal; *Bhorá* or *Bhoárá*, S. India, (Jerdon); *Kyai-tha-da*, Arakan (Phayre); *Silindit*, and *Silinditum*, Java (Horsfield).

HAB. Hilly parts of India, from the sub-Himalayan region to S. India; also Asám, Sylhet, Arakan, Tenasserim, and Java.

Remark. We have never seen this species from the Malayan peninsula, nor the preceding one from any country where the present is found; though both are extremely numerous in their respective habitats. *N. B.* Javanese specimens differ in no respect from Indian, though Dr. Horsfield states that the Javanese bird differs from *Ps. vernalis*—(*Mus. Carls.*) in size, and in the proportions of the wings to the tail." The latter may depend on the *mounting* in museum specimens.

14. L. ASIATICUS (Edwards, pl. 6).

SYN. *Psittacus asiaticus*, Latham.

Ps. indicus, Gmelin.

Pol-Girawa, Cingh.

HAB. Ceylon.

Remark. Peculiar as this species (or race) is to Ceylon, the names which have been applied to it are infelicitous. Its distinctive colouring from *L. vernalis* would appear to be constant (vide description in *J. A. S.* XVIII, 801). Nevertheless, it is so very closely affined to the Indian bird that many would prefer to regard it as a permanent local variety of the same species. Its distinctions from the Philippine *L. rubrifrons*, (Vigors), remain to be pointed out: and we have seen drawings of another, similar, but with the entire head as deep red

(from the S. of China?) *N. B.* Neither the *Eclecti* nor the *Loriculæ* have the tongue filamented as in the *Loriinæ*, with which they have been generally but quite erroneously classed. These two genera form a particular and peculiarly Asiatic division of the *Psittacinæ*, immediately preceding the *Loriinæ*. Such at least is the result of our long continued study of living specimens.

Here it should be remarked that the *Eos ornata (Psittacus ornatus*, Gmelin,) is stated by Raffles to inhabit the Malayan peninsula, but doubtless by mistake. With other Lories, &c., it is commonly brought by the Malays from the more eastern islands of the Archipelago, and may be frequently purchased in Calcutta and other ports.

Summary view of the distribution of the PSITTACIDÆ *in India and the neighbouring countries.* From the foregoing catalogue it follows that only two generic forms of *Psittacidæ* inhabit India, viz. *Palæornis* and *Loriculus*, nor are we aware that another occurs in all continental Asia, with the exception of *Tanygnathus* as exemplified by *T. malaccensis* in the Malayan peninsula, this species being however barely separable from *Palæornis*, and the peninsula itself belonging physically to the region of the archipelago, or *Indonesia*, as this region has been recently designated by Mr. Logan. *Tanygnathus* should accordingly be regarded as strictly an Indonesian form. In the Asiatic countries westward of Sindh, it does not appear that any species of Parrot has been observed;* and we know but little of those of Indo-China eastward of the British possessions on that side of the Bay of Bengal, or those of the southernmost provinces of China. In the great Indonesian or Austral-asian archipelago, the number of genera and of super-generic forms gradually increases to the eastward, where the Lories and species of white Cockatoo, also the two species of *Eclectus* among the *Psittacinæ*, and the large *Tanygnathi*, are met with in Borneo, Celebes, the Moluccas, and some of them even in the Philippines; forms of black Cockatoo appearing likewise in the Papuan group; while in Australia the *Psittacidæ* attain their maximum of developement as regards the number of genera and of species, though the two generic forms of India and certain others of Indonesia are foreign to the Australian fauna.

* Lieut. Irwin remarks,—"The Parrot and Maina are scarcely natives of Turkestan, or at least of the country beyond the Oxus." *J. A. S.* VIII., 1007. Surely neither of them is found there at all, *i. e.* any Parrot, *Acridotheres* (*verus*) or *Gracula*!

Sumatra and Java contain the large *Tanygnathi* perhaps as rarities, but no Cockatoo, nor *Eclectus;* and the only Lory, if any, is *Eos ornata*, which Sir St. Raffles reported by mistake (?) to inhabit the Malayan Peninsula.*

With regard to the distribution of *species* in India and the neighbouring countries, we first remark three of *Palæornis (Alexandri, torquatus,* and *cyanocephalus,)* as common—with unimportant local exceptions—to all India from the sub-Himalayan regions to Ceylon inclusive, and also to the eastward in Asám, Arakan, the Tenasserim provinces, and *P. torquatus* as far southward as Penang. Others are much more local, as *P. Calthrapæ* which is confined to the mountains of Ceylon, *P. columboides* to those of S. India, *P. schisticeps* to the sub-Himalayan regions, and *P. erythrogenis* (so far as known) to the Nicobar islands. Of *P. caniceps* we know of but two examples, one procured in the Nicobars, the other at or near Penang; and this may prove to be properly a species of Indo-China. In the hilly parts of Bengal, and along the S. E. sub-Himalayan regions, in Asám, Sylhet, Arakan, the Tenasserim provinces, and the Malayan peninsula to the latitude of Penang, *P. barbatus* abounds, and is common also in Sumatra, Java, and Borneo; but it is unknown in the Indian peninsula (though having for a synonyme the name *pondicerianus*), and it would seem equally so in the southern parts of the Malayan peninsula. In these latter countries its place would seem to be taken by *P. malaccensis;* and the range of *Tanygnathus malaccensis* and of *Loriculus galgulus* corresponds. In Malacca collections I have seen only the three last named species, added to which in Penang collections I have seen *P. torquatus, P. barbatus,* and one specimen of *P. caniceps:* while another of this last is the only Parrakeet which I have seen from the Nicobars in addition to *P. erythrogenis.* It is probable that both of these also inhabit the Andamans and the northern part of Sumatra. Of *Loriculus,* while *L. galgulus* would appear to be confined to the Malayan peninsula and Sumatra, and *L. asiaticus* (so

* We suspect that Raffles's statement of *Tanygnathus sumatranus* (of which he describes the female only, apparently from a captive individual,) inhabiting Sumatra, needs confirmation as much as that of *Eos ornata* inhabiting the Malayan peninsula. Dr. Horsfield does not mention any *Tanygnathus* or Lory as occurring in Java.

called) to Ceylon, *L. vernalis* ranges over the hilly regions of all India, with Asám, Arakan, the Tenasserim provinces, and also Java; like *Palæornis barbatus*, and similarly without invading (as it would seem) the regions tenanted by *L. galgulus* together with *P. malaccensis* and *Tanygnathus malaccensis*. It may further be remarked that the whole of these species are such as no zoologist would hesitate in regarding as indisputably distinct, with the exception of *Loriculus asiaticus*, which some would consider to be a local variety of *L. vernalis*; in which case the race of the Philippines (*L. rubrifrons*) and another we have seen figured with the entire head crimson, should likewise rank as varieties merely of *L. vernalis*.

Notice of Lieut. STRACHEY'S *Scientific Enquiries in Kumaon.*

From J. THORNTON, *Esq. Secretary to Government, N. W. P.*

To Secretary, Asiatic Society, Calcutta.

SIR,—I am desired by the Honorable the Lieutenant-Governor, N. W. P. to request that you will lay before the Asiatic Society, the annexed copy of a letter from Lieutenant R. Strachey, Bengal Engineers, who has lately been engaged on scientific enquiries in Kumaon, under the orders of this Government.

2. Lieutenant Strachey has embarked for England in the March Steamer from Calcutta, carrying with him all his papers and collections, which will be placed at the disposal of the Honorable the Court of Directors.

3. Lieutenant Strachey had not sufficient time after his return from Kumaon, to prepare any of his papers for publication. This will be more advantageously and easily done in England. My present communication is designed to inform the Society, and through them the public generally, of the nature and extent of Lieutenant Strachey's researches, and of the quarter, whence further information respecting them may be expected.

I have the honor to be, Sir,

Your obedient humble servant,

J. THORNTON,

Agra, the 25th March, 1850. *Secy. to Govt. N. W. P.*

From Lieut. R. STRACHEY, *Esq.*

To J. THORNTON, *Esq. Secretary to Government, N. W. P.*

SIR,—I have the honor to inform you that, in accordance with the permission granted to me by the Honorable Lieutenant Governor, I left Kumaon on the 4th Ultimo, having then brought to a conclusion my operations in that province.

In my letter to your address of the 3d April 1849, I explained fully the progress that I had made in my undertaking up to that date, and it will now therefore be only requisite that I should state what has been done in addition since that time, and to submit for the consideration of the Honorable Lieutenant Governor, my views as to the plan that should be adopted for the publication of the results of my enquiries.

The first object to which my attention was directed, the construction of the section of the Himalaya explanatory of its Botanical Geography, is still of necessity left incomplete; but the materials for its compilation are very ample, and the additional knowledge that has been acquired by Major Madden and myself during the past year, will be of much value in completing this part of my undertaking.

The provisional drawings of that part of the line which was best known, to which I referred in my letter above alluded to, were completed and have been submitted to the Honorable Lieutenant Governor. A memoir to accompany and explain these drawings was drawn out by Major Madden, but owing to my not having had any opportunity of conferring with that gentleman on the matter and to my attention having been unavoidably diverted to other objects that came more immediately before me, this paper has not been yet brought into a form suitable for publication.

The whole of my herbarium which now contains upwards of 2,000 species is now on its way to Calcutta, whence it will be sent on to England. On its arrival there I propose to undertake the comparison of the whole of it with properly named specimens, such as are to be found in the great Botanical collections in Europe, and then to draw out a fresh section with all the care that can be bestowed upon it.

I should likewise propose to draw out, if it be practicable, a catalogue of all the plants contained in my herbarium. This would form a valuable index to the Botany of this part of the Himalaya, and in it could be embodied descriptions of new plants, and identifications of synonyms,

besides some short description of the nature of each plant and the locality in which they are found.

I have greatly increased my knowledge of the Geological structure of Kumaon and Gurhwal during the past year, and I have added to my former collections a very considerable number of fossil shells &c., from the northern part of the mountains, from which I feel confident that the geological age of the strata in which these are found may be perfectly ascertained; and on the whole I consider that I shall be able to draw out a very fair geological map of Kumaon and Gurhwal, as well as geological sections such as were at first proposed.

My geological specimens are also now on their way to England with the herbarium.

In the department of Zoology matters are just as they were; the few specimens that I collected have likewise been dispatched to Calcutta.

The panoramic drawing of the mountains from the summit of Binson, has been completed, as I before said it had begun; this has also been laid before the Honorable Lieutenant Governor.

During the past season also my brother Captain H. Strachey, 66 Native Infantry, and I have been able to make some important additions to the topography of the country to the north of the snowy range in Kumaon and Gurhwal, by fixing, by trigonometrical operations, the position of the celebrated peak of Kailas, and of several other points of note. A map showing the combined result of this work and what was before known of this country has been executed by my brother, and has been shown to the Honorable Lieutenant Governor.

The calculations, on which the constructions of the map rests, were worked out by me sufficiently to permit of its being executed, but they take much time and must be carefully revised before any numerical results are published.

The meteorological observations which I was anxious to undertake have been conducted with as great care as was possible, and I have collected a considerable map of materials, which will I trust be a valuable addition to our knowledge of the phænomena in question. Besides other ordinary registers, I was enabled with the help of my brother Captain H. Strachey to make horary observations for a period of 24 hours at an ellevation of 18,400 feet, as well as similar horary observa-

tions for periods of several days in succession both at Niti, at about 11,500 feet, and at another place at a height of about 16,500 feet above the sea. I propose to undertake the reduction of these observations as soon after my return to England as is possible.

Magnetic observations of dip and intensity have been made by me at a great number of stations in Kumaon and Gurhwal, up to the elevation of 18,400 feet. On my way down to Calcutta, I have also observed the dip at some of the places at which I stopped.

In conclusion it appears to me that the best form in which the result of my enquiries in Kumaon can be published is, as a work on the Physical Geography of this part of the Himalaya. It is of course out of my power to offer to undertake any thing of this sort from my own private resources, but should the Honorable Court of Directors consider that the information which I have acquired is of sufficient value to induce them to give their countenance to such a work, and should they be satisfied with my ability to execute it in a becoming way, I shall consider it to be my first duty to undertake it and to devote myself entirely to its completion.

I have the honor to be, &c.

(Signed) R. STRACHEY,

Late on special duty in Kumaon.

(True Copy)

J. THORNTON,

Assistt. Secretary to the Govt. N. W. P.

Calcutta, the 7th March, 1850.

Memorandum relative to the Storms of Wind experienced in Tartary, with suggestions relative to them, for the Mission proceeding there. —*By* HENRY PIDDINGTON, *President of Marine Courts.*

The following Memorandum was drawn up for the use of the Mission proceeding to Chinese Tartary in 1847, which, as then announced, expected to winter at Yarkund. Documents of this nature are, the Editors think, always worthy of permanent record, inasmuch as they fulfil their object not only at the time, but in future, when other expeditions or opportunities for observation may occur, and are moreover scientific notes which are too useful to be lost, and do not readily occur in all their bearings to any but those whose minds have been directed to the questions to which they relate.—EDS.

1. Heavy storms of wind, which either from their violence, or their veering to different points while blowing, or from both, are by all

writers, from the Chinese travellers and Marco Polo down to Humboldt and Ehrmann, called *Hurricanes*, are undoubtedly most frequent, both in the steppes and mountain chains of Tartary and Siberia.

2. Now as connected both with Meteorology in general, and especially with the new science of the Law of Storms these *land hurricanes* in all countries are of the highest interest, but in the countries above named especially so, for the elevation, cold, and dryness of the air may develope phænomena of importance tending to disclose to us their *causes*, or they may furnish us with confirmations or modifications of the laws now supposed to govern storms.

3. There are two great questions arising on the consideration of them which are—

A. Are they *strait-lined* currents of air, blowing from one point to another? or are they curves, and thus parts of rotatory storms? and if so which way do they turn? and do they move onwards also?

B. Where are they formed? and how do they begin? at the surface of the earth? or in the atmosphere? in a word, are they, like waterspouts, *descending* storms?*

4. The first question is easily solved if we have only observations. If the wind is a strait stream there will be no change in its direction while blowing. If it is part of a circular storm moving onwards the wind will veer according to fixed laws. If it be a circular storm, but *stationary*, as some are, it will *seem* to be a strait blowing wind at the place of the observer, but if observations at a distance can be had, then it will be seen that it was *really* blowing in a circle or curve.

5. To explain this I send herewith a transparent horn-card on which the winds are marked as they turn (against the hands (hours) of a watch) in the northern hemisphere. In the southern hemisphere they turn *with* the hours.

6. This card may be supposed to represent any sized rotatory storm, from a tornado of 100 yards to a storm of 1000 miles in diameter.

7. Now Humboldt and other travellers in Siberia speak of "horrible tempests" of wind and rain from the plains of Tartary from the

* There is some evidence, which will appear in a work I am now printing tending to shew that hurricanes at sea *are* descending storms! hence the great importance of this query.

S. E. It will be seen by looking at the wind card, that supposing the wind due S. E. throughout the storm, it may be part of a great circle of wind and if it veers at all, that, as we shall shew presently below, it must be travelling along on a certain track.

8. For: make a mark with a fly on a sheet of paper to represent the place of observation.

Place the horn card with the point marked E. N. E. upon the flag. This is we will suppose the state of things when the E. N. E. wind is rising to the strength of a gale.

9. Now move the card gradually over the flag *to the left* till the S. E. point is over it, and it will be seen that the wind has gradually become E. b. N., East, E. b. S., E. S., E. S. E. b. E. and S. E. and that such veering of the wind indicates a circular storm moving up *from* E. b. S. to W. b. N. In such a case the greatest violence will be felt and the Barometer will be lowest when the wind is about E. b. S. because then the centre is nearest.

10. Again: put the card at the S. E. *wind-point* over the flag and move it up *to the right* till the N. W. wind-point comes over the flag.

Now, at half-way you will see that the flag is at the vacant space in the centre of the card. This is *the centre of the hurricane*, in which, between the Tropics, there is most frequently a dead calm before the shift, but often none; and the wind shifts or veers very rapidly to the opposite quarter or thereabouts, and blows as hard as ever.

11. This is the case of a storm moving up *from* the S. W. to the N. E. and its centre passing exactly over you.

12. We do not know that all or any part of this will occur, but it is easy to know if it does, if the veering of the wind be registered; and at the same time the Barometer, or Simpiesometer, or both. I give now two suppositious registries of storm days, such as would be invaluable to us.

No. I.

September 15th, 1847.—At 9 A. M. encamped at Chuen-lung, the guides predicting a storm.

Secured every thing. My tent between two rocks just at the entrance of a little defile, whence a good view of the plain to the east, south, and round to N. W. and by a few paces round the rock the rest of the horizon could be seen. 9¼ A. M. wind E. N. E. Bar.

— Ther. — wind piercing cold, and rising and falling with a sort of moaning noise.

Sky, light, hazy, vapory blue, and very thin sheets of scud flying from N. E. and north.

10 A. M. Blowing hard at E. b. N.

Bar. — Ther. —.

Strong haze above, dust-storm below, like those on the plains of India in the hot winds.

Noon: hurricane at due East tearing up everything; tent would go if not for the shelter of the rocks, Bar. — Ther. —.

Wind cold, some blasts warmer; blowing in heavy squalls. Barometer evidently oscillating with the squalls. Packed it up for fear of accident. At 12*h*. 45*m*he thorizon one mass of dust, but a singular blue circle above us comparatively clear: subtends an arch of 45° or 50°.

1 P. M. more interval between the blasts. Wind E. S. E. Ther.—

2 P. M. wind S. E. b. E. more moderate but blowing hard.

2.30. P. M. moderate but strong gale at S. E. Set up Barometer again, Bar. — Ther. —.

3 P. M. moderating fast and our guides say all is over.

During the whole of the storm the dryness remarkable.

By shading the eyes, faint flashes of lightning could be seen. No thunder heard; but the roaring of the wind would prevent it if the thunder was not loud.

Guides say sometimes thunder, sometimes not; and that though it never *rains* with these storms in summer; in winter it snows with them; but they cannot say if the snow *falls* or drifts like the dust. They say that sometimes there is a dead calm in the middle of the hurricane, and that the wind then comes from the opposite quarter and that these are the most violent storms. They speak of these with much dread.

No II.

At Iskardo, October 22nd.—Our landlord sent his servants to secure all the doors and windows, saying we were going to have a storm.

Sky clear, but from the gallery to the S. W. a dense low lead-coloured cloud could be seen about ten degrees in altitude and subtending an arch from south nearly to west. Sky hazy, no scud or drift. Sun rose

very red. Wind south and light, rising and falling with a moaning noise. At 10 A. M. wind S. E. blowing very strong in squalls. Bar. — and oscillating about, .03 to .05 every quarter of an hour or less. Ther. —. The whole horizon is now covered with a sort of dark haze which is, I suppose, mostly dust. No rain. Above clear hazy blue sky with very thin wreaths of scud flying to the N. W. very fast, and these are thicker and more numerous towards the dark haze and in the S. W. than at the zenith when they disappear. 10*h*. 30*m*. Bar. — Ther. —. Wind steady at S. E. Bar. oscillating .05 to .07 in the squalls of wind, which are now almost of hurricane strength, &c. Noon, a hurricane from S. E. roaring heavily; the sky one mass of dust mingled with spiculæ of ice or snow. Impossible to look to windward. Tiles and planks flying about like feathers. Our landlord says that many persons are hurt and some killed in these storms. Bar. oscillates much less. *Wind seems to oscillate also* being from S. E. to E. S. E. or even East (as far as we can judge) and then coming back to S. East again.

At 12° 30′ it fell a dead calm in a few minutes. Bar. — Ther. — a slight feeling of oppression.

At ¼ to 1 P. M. we heard a low roaring sound which gradually became louder and at 1 the hurricane burst forth again from the S. W. with a few sharp flashes of lightning (but no thunder) blowing harder than before. Bar. at 1 P. M. — Ther.

At 1. 30.
2.
2. 30.
} P. M. Bar. Ther.
&c. &c. &c. to the end of the storm.

13. A set of observations like this; i. e. one or more storms carefully observed throughout, with all the details *(and the more details the better)* would be invaluable from these countries. Notes on the common dust-whirlwinds also, whatever be their size, will be useful in explaining what is desired as to them. Every thing in fact relating to the phænomena of wind and its attendant clouds, electricity, &c. must be of interest and probably of use. The question also of the existence of any thing like the Simooms of the Sahara in the desert of Cobi* would be worth settling.

14. If any knowledge on the subject of these tempests can be col-

* During the summer.

lected from guides, travellers, &c. it may be valuable, and I add a few queries which will suggest more.

15. If it could be possible to establish the dates of the occurrences of storms at various points we might thus also obtain other evidence of their progression and routes, as also of their rates of travelling. Thus if a storm was felt at Yarkund on the 10th, and at Iskardo on the 13th, and we found that it *was* travelling to the S. westward at Yarkund the probabilities then are, that it is the same storm which has taken three days to pass over this distance. If its passage over an intermediate station was known this would be a certainty. At sea circular storms travel from $1\frac{3}{4}$ up to 48 miles an hour on their tracks.

Queries to be put as occasion offers to guides, travellers, head-men of villages, &c.

1. What are the names by which you call the different kinds of whirlwinds and storms of wind of all kinds, large and small?

2. Why do you call them by those names? Are the names only those of their deities, &c. or because of their motion, or of their effects?

3. Are these names Tartar or Chinese?

4. Do you know the kinds of wind-storms which the Chinese call by the names of

A. *Tae-fung* (great wind).

B. *Kow-fung* or *fung-kou* (great turning wind?)

C. *Tëe-hwuy* (Iron whirlwind).

D. *Tee-kew* (Iron whirlwind).

E. A noise before the tyfoon called *Lëen-fung* (a tyfoon brewing), or any other kinds, and what are their Chinese and Tartarian names?

5. What are the effects of these various winds?

6. What are the Tartar names of the different gods or spirits of the winds?

7. Do you know of the goddess or spirit called by the Chinese *Keu-woo?* (The tyfoon-mother).

8. Have you, or the Chinese, any temples dedicated to the spirits of the winds?

9. Have you any particular quarter of the heavens from which the storms come; like what the Chinese call *Luy-chow* (or the region of the thunder)?

10. What sacrifices are performed at the wind temples ?

11. Do you, or the Chinese, express the dread you have of these storms by the Chinese words *Chung wei che.* (There is a sincere awe or dread of it (the tyfoon) ?

12. Do you express the termination of the storm by the Chinese words *Loc-se* (falling in the west) ?

13. How long do these storms last ; and what is the longest and shortest time of their duration ?

14. How do they begin ?

15. How do they continue ? strait from the same quarter or turning ?

16. How do they turn ?

17. Do they always turn the same way ?

18. At what time of the moon do they usually occur ?

19. How often in the year ?

20. Give the dates, years, and months of any of those which are recollected as being particularly violent, and where they occurred ?

21. In what parts are they most violent ?

22. And at what season of the year do they occur mostly, and when most violently ?

23. Are they storms of wind and dust only ; or of hail or snow or rain ?

24. Do the winter storms last longer than the summer ones ?

25. Do they ever overwhelm travellers, caravans, &c. and when and where does this occur ?

26. Do you know of their approach by any signs ; and what are these signs (sun, moon, stars, clouds, noises, behaviour of animals, &c.) ?

27. Are there (in the summer) any *hot* whirlwinds ? Describe them.

28. Is there ever a calm in the middle of the heavy wind-storms, and then does the wind begin to blow hard again, and is it then from the same point ?

29. Have you yourself been in these storms ?

30. Do they hurt your crops, or gardens, or animals ?

31. Do they ever seem to burn up the grass where they pass ?

32. Is there any thunder and lightning with them or at the end ?

33. Do they destroy houses if not well built ?

34. Are they most violent in the hills and mountain passes, or at the foot of them or when altogether in the plains?

35. In what countries are they most violent; i. e. do they do most mischief?

36. Have the volcanoes and the hurricanes any connection; that is, did you ever hear or know that the eruption of the volcanoes caused hurricanes?

37. Are there any parts of the country which you know or of which you have heard that cannot be traversed on account of the storms and when does this occur?

Of course no one individual will be able to reply to all these questions, but from the priests and head-men down to the guides, each may give his quota and their replies may lead to more information.

The religious part of the queries is of interest as like the other Chinese ones, it may shew the connection between the Chinese maritime storms and deities and the inland ones.

P. S. As illustrating this singular phænomenon of inland hurricanes, I add here a passage from the forthcoming new edition of the Sailor's Horn-Book, from which it would appear that hurricanes (as to violence) are perfectly well known to the Tchukutskoi of Behring's Straits! and they are also most frequent and severe, and true revolving storms in Iceland! See Vol. XIV. p. 297, of Jameson's Edinburgh Journal of Science in a paper on the Glaciers and climate of Iceland by W. Sartorius Von Walterhausen.

"Kotzebue in the *Rurick's* voyage of discovery, Vol. II. p. 160 of the 8vo. edition, describes a storm of hurricane violence on the 13th April, in Lat. 44° 30′ N. Long. 181° West, but he gives no account of the veering of the wind. Again in the voyage of the Rurick, Vol. I. p. 264, after a smart gale in the neighbourhood of the St. Lawrence Islands he was informed by the Tchukutskoi of St. Lawrence's Bay on the Asiatic Coast of Behring's Straits in 65° 40′ North "that the time of violent storms was at hand, and that the last had been only a faint wind. He gave us to understand that in a real storm nobody was able to stand on their legs, but that they were obliged to lay themselves flat on the ground." This is exactly, as to violence, the description which a Carib of the West Indian islands might have given to Columbus, or which a Mauritius or Jamaica negro would give of their hurricanes in

the present day. I have heard it often said in descriptions of hurricanes there, by persons of all classes, that fearful that the dwelling-house might be blown down the family crept on the ground on all fours (lying flat down when the gusts were most furious) to reach the nearest negro hut or other low sheltered spot; or a "hurricane house" built of stone for such occasions. Are these Behring's Straits storms analogous to those which arise in the interior of the continent of North America and pass out to sea over Newfoundland? and do the Asiatic storms arise in the plains of eastern Siberia and travel out towards Behring's Straits?"

Tables of Mortality according to the experience of the Bengal Civil Service, with the values of Annuities, Assurances, &c.—By Capt. J. C. HANNYNGTON, *Bengal Army.*

The following tables are founded on the data contained in a general list of the Civil Service of the Bengal Presidency which was published some years ago by Rámchander Dás under the superintendence of the Hon'ble H. T. Prinsep. A slight liberty has been taken with the ages under 25, in order to avoid irregularities in the premia for short assurances. The deviation is however small, and from 25 to 60, the actual data are very closely followed. After 60 the experience is too limited to be serviceable, and the table was thence continued and joined to the Northampton table by means of a curve and its ordinates.

The rate of mortality though higher than the English rates, is much more favourable than that determined by Mr. Woolhouse for the Bengal Military. The resulting rates of assurance premia are accordingly considerably less than those now used by Assurance offices. Nevertheless the rates here exhibited are beyond doubt sufficient; for Mr. Nelson's recent investigations on military lives give still lower rates, and hence it may be fairly inferred that the civil experience if further extended would lead to further reductions.

These remarks may serve to justify the publication of these tables, by shewing that they are fit to be used. The allusion to assurance rates will not it is hoped, be thought misplaced. It springs naturally

out of the subject, and vital statistics unless applied to the *business* of life assurance are of little worth. The tables have been prepared with attention to practical details, for practical purposes, in hope that they may be found useful.

It has not been considered necessary to add a summary of formulæ adapted to Commutation tables. They can be readily obtained by those who may require them.

TABLE I.—*Law of Mortality, Bengal Civil Service.*

Age.	Number that complete each year of age.	Number that die in the next year of age.	Sum of the living at all ages.	Mean duration of life.	Useful logarithms.			
x	l_x	$l_x - l_{x+1}$	$\Sigma(l_x)$	e_x	$\log. l_x$	$\operatorname{colog.} l_x$	$\log. p_x$	$\operatorname{colog.} p_x$
20	9085	153	274798	30.00	9583249	0416751	9926238	0073762
21	8932	151	265713	29.50	9509487	0490513	9925953	0074047
22	8781	149	256781	28.99	9435440	0564560	9825674	0174326
23	8632	148	248000	28.47	9361114	0638886	9924893	0075107
24	8484	147	239368	27.96	9286007	0713993	9924091	0075909
25	8337	147	230884	27.43	9210098	0789902	9922741	0077259
26	8190	145	222547	26.91	9132839	0867161	9922321	0077679
27	8045	145	214357	26.38	9055260	0944740	9921011	0078989
28	7900	144	206312	25.62	8976271	1023729	9920107	0079893
29	7756	144	198412	25.08	8896378	1103622	9981610	0018390
30	7612	145	190656	24.55	8814988	1185012	9916474	0083526
31	7467	145	183044	24.01	8731462	1268538	9914835	0085165
32	7322	146	175577	23.48	8646297	1353703	9912527	0087473
33	7176	146	168255	22.95	8558824	1441176	9910729	0089271
34	7030	146	161079	22.41	8469553	1530447	9908856	0091144
35	6884	148	154049	21.88	8378409	1621591	9905612	0094388
36	6736	151	147165	21.35	8284021	1715979	9901537	0098463
37	6585	154	140429	20.83	8185558	1814442	9897227	0102773
38	6431	157	133844	20.31	8082785	1917215	9892660	0107340
39	6274	160	127413	19.81	7975445	2024555	9887809	0112191
40	6114	165	121139	19.31	7863254	2136746	9881186	0118814
41	5949	167	115025	18.83	7744440	2255560	9876341	0123659
42	5782	171	109076	18.37	7620781	2379219	9869622	0130378
43	5611	174	103294	17.91	7490403	2509597	9863190	0136810
44	5437	176	97683	17.47	7353593	2646407	9857090	0142910
45	5261	178	92246	17.04	7210683	2789317	9850518	0149482
46	5083	179	86985	16.61	7061201	2938799	9844304	0155696
47	4904	181	81902	16.20	6905505	3094495	9836674	0163326
48	4723	181	76998	15.80	6742179	3257821	9830292	0169708
49	4542	180	72275	15.41	6572471	3427529	9824386	0175614

Age.	Number that complete each year of age.	Number that die in the next year of age.	Sum of the living at all ages.	Mean duration of life.	Useful logarithms.			
x	l_x	$l_x - l_{x+1}$	$\Sigma(l_x)$	e_x	$log.\ l_x$	$colog.\ l_x$	$log.\ p_x$	$colog.\ p_x$
50	4362	180	67733	15.03	6396857	3603143	9816983	0183017
51	4182	179	63371	14.65	6213840	3786160	9810016	0189984
52	4003	176	59189	14.29	6023856	3976144	9804729	0195271
53	3827	175	55186	13.92	5828585	4171415	9796723	0203277
54	3652	173	51359	13.56	5625308	4374692	9789236	0210764
55	3479	168	47707	13.21	5414544	4585456	9785048	0214952
56	3311	166	44228	12.86	5199592	4800408	9776614	0223386
57	3145	163	40917	12.51	4976206	5023794	9768870	0231130
58	2982	159	37772	12.17	4745076	5254924	9762033	0737967
59	2823	155	34790	11.82	4507109	5492891	9754749	0245251
60	2668	150	31967	11.48	4261858	5738142	9748699	0251301
61	2518	147	29299	11.14	4010557	5989443	9738759	0261241
62	2371	142	26781	10.80	3749316	6250684	9731785	0268215
63	2229	138	24410	10.45	3481101	6518899	9722439	0277561
64	2091	135	22181	10.11	3203540	6796460	9710149	0289851
65	1956	130	20090	9.77	2913689	7086311	9701319	0298681
66	1826	127	18134	9.43	2615008	7384992	9686926	0313074
67	1699	122	16308	9.10	2301934	7698066	9676383	0323617
68	1577	118	14609	8.77	1978317	8021683	9662236	0337764
69	1459	114	13032	8.43	1640553	8359447	9646670	0353330
70	1345	110	11573	8.10	1287223	8712777	9629447	0370553
71	1235	104	10228	7.78	0916670	9083330	9617956	0382044
72	1131	100	8993	7.45	0534626	9465374	9597961	0402039
73	1031	95	7862	7.13	0132587	9867413	9580171	0419829
74	936	90	6831	6.80	9712758	0287242	9560946	0439054
75	846	85	5895	6.47	9273704	0726296	9540143	0459857
76	761	80	5049	6.13	8813847	1186153	9517624	0482376
77	681	75	4288	5.80	8331471	1668529	9493255	0506745
78	606	70	3607	5.45	7824726	2175274	9466922	0533078
79	536	67	3001	5.10	7291648	2708352	9420080	0579920
80	469	63	2465	4.75	6711728	3288272	9373532	0626468
81	406	60	1996	4.41	6085260	3914740	9305501	0694499
82	346	57	1590	4.09	5390761	4609239	9218217	0781783
83	289	55	1244	3.80	4608978	5391022	9083181	0916819
84	234	48	955	3.58	3692159	6307841	9006970	0993030
85	186	41	721	3.37	2695129	7304871	8918551	1081449
86	145	34	535	3.19	1613680	8386320	8839550	1160450
87	111	28	390	3.01	0453230	9546770	8737551	1262449
88	83	21	279	2.86	9190781	0809219	8733136	1266864
89	62	16	196	2.66	7923917	2076083	8703661	1296339
90	46	12	134	2.41	6627578	3372422	8687211	1312789
91	34	10	88	2.09	5314789	4685211	8487323	1512677
92	24	8	54	1.75	3802112	6197888	8239088	1760912
93	16	7	30	1.37	2041200	7958800	7501225	2498775
94	9	5	14	1.05	9542425	0457575	6478175	3521825
95	4	3	5	0.75	6020600	3979400	3010300	6989700
96	1	1	1	0.50	0000000	0000000	0000000	0000000

TABLE II.—*Annuities, Assurances, &c. Four per Cent.*

Age x.	D.	N.	S.	M.	R.	Annuity. a_x
20	4146.28	62701.09	864804.71	1575.218	31014.528	15.122
21	3919.66	58781.43	802103.62	1508.077	29439.310	14.998
22	3705.19	55076.24	743322.19	1444.361	27931.233	14.865
23	3502.23	51574.01	688245.95	1383.908	26486.872	14.726
24	3309.79	48264.22	636671.94	1326.170	25102.964	14.582
25	3127.35	45136.87	588407.72	1271.028	23776.794	14.433
26	2954.04	42182.83	543270.85	1218.007	22505.766	14.280
27	2790.14	39392.69	501088.02	1167.718	21287.759	14.119
28	2634.47	36758.22	461695.33	1119.364	20120.041	13.953
29	2486.97	34271.25	424937.11	1073.190	19000.677	13.780
30	2346.92	31924.33	390665.86	1028.793	17927.487	13.603
31	2213.67	29710.66	358741.53	985.806	16898.694	13.421
32	2087.19	27623.47	329030.87	944.472	15912.889	13.235
33	1966.90	25656.57	301407.40	904.454	14968.417	13.044
34	1852.77	23803.80	275750.83	865.976	14063.962	12.848
35	1744.51	22059.29	251947.03	828.977	13197.986	12.645
36	1641.35	20417.94	229887.74	792.914	12369.009	12.440
37	1542.84	18875.10	209469.80	757.535	11576.095	12.237
38	1448.81	17426.29	190594.70	722.841	10818.560	12.028
39	1359.08	16067.21	173168.41	688.832	10095.718	11.822
40	1273.48	14793.73	157101.20	655.506	9406.886	11.617
41	1191.45	13602.28	142307.47	622.460	8751.380	11.417
42	1113.47	12488.81	128705.19	590.300	8128.920	11.217
43	1038.98	11449.83	116216.38	558.636	7538.621	11.020
44	968.038	10481.792	104766.546	527.656	6979.984	10.828
45	900.675	9581.117	94284.754	497.525	6452.328	10.638
46	836.732	8744.385	84703.637	468.224	6954.803	10.451
47	776.218	7968.167	75959.252	439.891	5486.579	10.265
48	718.816	7249.351	67991.085	412.344	5046.688	10.085
49	664.681	6584.670	60741.734	385.856	4634.344	9.909
50	613.788	5970.882	54157.064	360.528	4248.488	9.728
51	565.827	5405.055	48186.182	336.174	3887.960	9.553
52	520.777	4884.278	42781.127	312.887	3551.786	9.379
53	478.731	4405.547	37896.849	290.870	3238.899	9.203
54	439.269	3966.278	33491.302	269.821	2948.029	9.029
55	402.366	3563.912	29525.024	249.813	2678.208	8.857
56	368.207	3195.705	25961.112	231.130	2428.395	8.679
57	336.295	2859.410	22765.407	213.379	2197.266	8.503
58	306.601	2552.809	19905.997	196.620	1983.886	8.326
59	279.090	2273.719	17353.188	180 901	1787.266	8.147

TABLE II.—*(Continued).*

Age x.	D.	N.	S.	M	R.	Annuity. a_x
60	253.621	2020.098	15079.469	166.167	1606.3653	7.965
61	230.156	1789.942	13059.371	152.456	1440.1988	7.769
62	208.384	1581.558	11269.429	139.536	1287.7428	7.590
63	188.369	1393.189	9687.871	127.536	1148.2065	7.396
64	169.911	1223.278	8294.6823	116.323	1020.6704	7.200
65	152.7275	1070.5504	7071.4044	105.775	904.3479	7.010
66	137.1830	933.3674	6000.8540	96.0080	798.5733	6.804
67	122.7325	810.6349	5067.4866	86.8338	702.5653	6.605
68	109.5380	701.0969	4256.8517	78.3597	615.7315	6.401
69	97.4440	603.6529	3555.7548	70.4787	537.3718	6.195
70	86.3751	517.2778	2952.1019	63.1577	466.8931	5.989
71	76.2605	441.0173	2434.8241	56.3652	403.7355	5.783
72	67.1525	373.8648	1993.8268	50.1903	347.3702	5.567
73	58.8606	315.0042	1619.9420	44.4812	297.1799	5.351
74	51.3817	263.6225	1304.9378	39.2662	252.6987	5.131
75	44.6550	218.9675	1041.3153	34.5157	213.4325	4.904
76	38.6234	180.3441	822.3478	30.2016	178.9169	4.669
77	33.2338	147.1103	642.0037	26.2975	148.7153	4.426
78	28.4362	118.6741	494.8934	22.7782	122.4178	4.173
79	24.1842	94.4899	376.2193	19.6198	99.6396	3.907
80	20.3473	74.1426	281.7294	16.71302	80.01985	3.644
81	16.9366	57.2060	207.5868	14.08494	63.30682	3.378
82	13.8785	43.3275	150.3808	11.67826	49.22189	3.122
83	11.1463	32.1812	107.0533	9.47986	37.54362	2.887
84	8.67791	23.50329	74.87207	7.44018	28.06377	2.708
85	6.63253	16.87076	51.36878	5.72855	20.62359	2.544
86	4.97165	11.89911	34.49802	4.32278	14.89504	2.393
87	3.65951	8.23960	22.59891	3.20185	10.57226	2.252
88	2.62114	5.60846	14.35931	2.31423	7.37041	2.132
89	1.88984	3.71862	8.75085	1.67413	5.05618	1.968
90	1.34821	2.370411	5.032226	1.205185	3.382050	1.758
91	0.95818	1.412236	2.661815	0.867006	2.176865	1.474
92	0.65034	0.761891	1.249579	0.596029	1.309859	1.172
93	0.41689	0.345003	0.487688	0.387585	0.713830	0.828
94	0.22548	0.119522	0.142686	0.212211	0.326246	0.530
95	0.09636	0.023163	0.023163	0.091762	0.114035	0.240
96	0.02316	0.000000	0.000000	0.022272	0.022272	0.000

TABLE III.—*Five per Cent.*

Age.	D.	N.	Annuity. a_x
20	3424.04	45633.46	13.327
21	3206.07	42427.39	13.233
22	3001.78	39425.61	13.134
23	2810.33	36615.28	13.029
24	2630.62	33984.66	12.919
25	2461.94	31522.72	12.804
26	2303.36	29219.36	12.686
27	2154.84	27064.52	12.560
28	2015.24	25049.28	12.430
29	1884.29	23164.99	12.293
30	1761.25	21403.74	12.153
31	1645.42	19758.32	12.008
32	1536.64	18221.68	11.858
33	1434.29	16787.39	11.704
34	1338.19	15449.20	11.545
35	1248.00	14201.20	11.379
36	1163.02	13038.18	11.210
37	1082.81	11955.37	11.041
38	1007.13	10948.24	10.870
39	935.754	10012.487	10.699
40	868.467	9144.020	10.529
41	804.530	8339.490	10.365
42	744.957	7594.533	10.194
43	688.494	6906.039	10.030
44	635.375	6270.664	9.869
45	585.531	5685.133	9.709
46	538.781	5146.352	9.551
47	495.055	4651.297	9.395
48	454.079	4197.218	9.243
49	415.883	3781.335	9.092
50	380.383	3400.952	8.940
51	347.320	3053.632	8.792
52	316.623	2737.009	8.644
53	288.287	2448.722	8.493
54	262.004	2186.718	8.346
55	237.708	1949.010	8.199
56	215.456	1733.554	8.046
57	195.108	1538.446	7.885
58	176.006	1362.440	7.741
59	158.687	1203.753	7.585

TABLE III.—*(Continued.)*

Age.	D.	N.	Annuity. a_x
60	142.833	1060.920	7.427
61	128.383	932.537	7.262
62	115.132	817.405	7.099
63	103.082	714.323	6.929
64	92.096	622.227	6.756
65	82.073	540.154	6.581
66	72.947	467.207	6.404
67	64.641	402.566	6.228
68	57.143	345.423	6.045
69	50.349	295.074	5.861
70	44.205	250.869	5.675
71	38.656	212.213	5.489
72	33.716	178.497	5.294
73	29.2712	149.2258	5.098
74	25.3086	123.9172	4.896
75	21.7858	102.1314	4.688
76	18.6637	83.4677	4.472
77	15.9064	67.5613	4.247
78	13.4805	54.0808	4.011
79	11.3556	42.7252	3.762
80	9.4630	33.2622	3.515
81	7.80177	25.46043	3.263
82	6.33218	19.12825	3.020
83	5.03716	14.09109	2.797
84	3.88432	10.20677	2.627
85	2.94051	7.26626	2.471
86	2.18317	5.08309	2.328
87	1.59167	3.49142	2.193
88	1.13350	2.35792	2.080
89	0.80639	1.55153	1.924
90	0.56980	0.98173	1.723
91	0.40110	0.58063	1.447
92	0.26965	0.31098	1.153
93	0-17120	0.13978	0.816
94	0.09172	0.04806	0.524
95	0.03882	0.00924	0.238
96	0.00924	0.00000	0.000

TABLE IV.—*Six per Cent.*

Age.	D.	N.	Annuity. a_x
20	2832.75	33648.08	11.878
21	2627.40	31020.68	11.807
22	2436.77	28583.91	11.730
23	2259.83	26324.08	11.649
24	2095.37	24228.71	11.563
25	1942.51	22286.20	11.473
26	1800.24	20485.96	11.380
27	1668.28	18817.68	11.280
28	1540.48	17277.20	11.215
29	1431.42	15845.78	11.070
30	1325.33	14520.45	10.956
31	1226.49	13293.96	10.921
32	1134.597	12159.364	10.717
33	1049.032	11110.332	10.591
34	669.518	10140.814	10.460
35	895.644	9245.170	10.322
36	826.782	8418.388	10.182
37	762.498	7655.890	10.040
38	702.515	6953.375	9.898
39	646.570	6306.805	9.756
40	594.416	5712.389	9.610
41	545.637	5166.752	9.469
42	500.301	4666.451	9.327
43	458.024	4208.427	9.188
44	418.698	3789.729	9.051
45	382.213	3407.516	8.915
46	348.378	3059.138	8.781
47	317.084	2742.154	8.648
48	288.095	2453.959	8.518
49	261.372	2192.587	8.389
50	236.806	1955.781	8.259
51	214.183	1741.598	8.131
52	193.411	1548.187	8.004
53	174.441	1373.746	7.875
54	157.041	1216.705	7.747
55	141.1341	1075.5709	7.621
56	126.7158	948.8551	7.488
57	113.5498	835.3053	7.356
58	101.5704	733.7349	7.224
59	90.7120	643.0229	7.089

TABLE IV.—*(Continued.)*

Age.	D.	N.	Annuity. a_x
60	80.8787	562.1442	6.950
61	72.0108	490.1334	6.806
62	63.9687	426.1647	6.662
63	56.7336	369.4311	6.512
64	50.2087	319.2224	6.358
65	44.3086	274.9138	6.204
66	39.0224	235.8914	6.045
67	34.2532	201.6382	5.887
68	29.9939	171.6443	5.723
69	26.1789	145.4654	5.557
70	22.7673	122.6981	5.389
71	19.7219	102.9762	5.222
72	17.0389	85.93736	5.047
73	14.65313	71.28423	4.865
74	12.54994	58.73429	4.680
75	10.70115	48.03314	4.489
76	9.08111	38.95203	4.289
77	7.66647	31.28556	4.081
78	6.43599	24.84957	3.861
79	5.37033	19.47924	3.627
80	4.43300	15.04624	3.394
81	3.62036	11.42588	3.156
82	2.91068	8.51520	2.296
83	2.29356	6.22164	2.713
84	1.75196	4.46968	2.551
85	1.31376	3.15592	2.402
86	0.96619	2.18973	2.266
87	0.69777	1.49196	2.138
88	0.49222	0.99974	2.031
89	0.34687	0.65287	1.882
90	0.24279	0.41008	1.689
91	0.16930	0.24078	1.422
92	0.11274	0.12804	1.136
93	0.07091	0.05713	0.806
94	0.03763	0.01950	0.518
95	0.01578	0.00372	0.236
96	0.00372	0.00000	0.000

TABLE V.—*Seven per Cent.*

Age.	D.	N.	Annuity. a_x
20	2347.74	25108.99	10.695
21	2157.19	22951.80	10.640
22	1981.89	20967.91	10.581
23	1820.89	19149.02	10.511
24	1672.59	17476.43	10.449
25	1536.09	15940.34	10.377
26	1410.28	14530.06	10.303
27	1294.68	13235.38	10.223
28	1188.82	12046.56	10.133
29	1090.21	10956.35	10.050
30	999.967	9956.380	9.957
31	916.746	9039.634	9.860
32	840.135	8199.499	9.760
33	769.516	7429.983	9.655
34	704.542	6725.441	9.546
35	644.776	6080.665	9.431
36	589.639	5491.026	9.313
37	538.711	4952.315	9.193
38	491.692	4460.623	9.072
39	448.309	4012.314	8.950
40	408.295	3604.019	8.802
41	371.286	3232.733	8.707
42	337.256	2895.477	8.585
43	305.871	2589.606	8.466
44	276.996	2312.610	8.349
45	250.495	2062.115	8.232
46	226.186	1835.929	8.117
47	203.945	1631.984	8.002
48	183.568	1448.416	7.890
49	164.984	1283.432	7.779
50	148.280	1135.152	7.655
51	132.682	1002.470	7.555
52	118.694	883.776	7.437
53	106.0518	777.7241	7.333
54	94.5816	683.1425	7.223
55	84.2067	598.9358	7.113
56	74.8976	524.0382	6.997
57	66.4883	457.5499	6.882
58	58.9181	398.6318	6.766
59	52.1276	346.5042	6.647

TABLE V.—*(Continued.)*

Age.	D.	N.	Annuity. a_x
60	46.0425	300.4617	6.526
61	40.6112	259.8505	6.398
62	35.7386	224.1119	6.271
63	31.4002	192.7117	6.137
64	27.5391	165.1726	5.998
65	24.0671	141.1055	5.863
66	21.0077	120.0978	5.712
67	18.2591	101.8387	5.577
68	15.8392	85.9995	5.429
69	13.6954	72.3041	5.279
70	11.7993	60.5048	5.128
71	10.1256	50.3792	4.977
72	8.66624	41.71297	4.813
73	7.38317	34.32980	4.650
74	6.26436	28.06544	4.480
75	5.29160	22.77384	4.304
76	4.44854	18.32530	4.120
77	3.72046	14.60484	3.926
78	3.09413	11.51071	3.720
79	2.55768	8.95303	3.500
80	2.09156	6.86147	3.281
81	1.69215	5.16932	3.055
82	1.34774	3.82158	2.836
83	1.05207	2.769512	2.632
84	0.796119	1.973393	2.479
85	0.591415	1.381978	2.337
86	0.430886	0.951092	2.207
87	0.308272	0.642820	2.085
88	0.215430	0.427390	1.984
89	0.150396	0.276994	1.842
90	0.104283	0.172711	1.656
91	0.072037	0.100674	1.398
92	0.047523	0.053151	1.118
93	0.029609	0.023542	0.795
94	0.015566	0.007976	0.512
95	0.006465	0.001511	0.234
96	0.001511	0.000000	0.000

TABLE VI.—*Eight per Cent.*

Age.	D.	N.	Annuity. a_x
20	1949.170	18926.567	9.710
21	1774.393	17152.174	9.670
22	1615.182	15536.992	9.619
23	1470.162	14066.830	9.568
24	1337:921	12728.909	9.514
25	1217.351	11511.558	9.456
26	1107.302	10404.256	9.396
27	1007.128	9397.128	9.331
28	915.7185	8481.4097	9.262
29	832.4322	7648.9775	9.189
30	756.2602	6892.7173	9.114
31	687.0838	6205.6335	9.032
32	623.8348	5581.7987	8.948
33	566.1070	5015.6917	8.860
34	513.5085	4502.1832	8.767
35	465.5962	4036.5870	8.670
36	421.8392	3614.7478	8.569
37	381.8360	3232.9118	8.467
38	345.2835	2887.6283	8.363
39	311.9019	2575.7264	8.258
40	281.4331	2294.2933	8.152
41	253.5537	2040.7396	8.049
42	228.1815	1812.5581	7.943
43	205.0306	1607.5275	7.840
44	183.9560	1423.5715	7.739
45	164.8160	1258.7555	7.637
46	147.4441	1111.3114	7.537
47	131.7146	979.5968	7.438
48	117.4567	862.1401	7.340
49	104.5883	757.5518	7.243
50	93.0032	664.5486	7.145
51	82.5606	581.9880	7.049
52	73.1729	508.8151	6.954
53	64.7738	444.0413	6.855
54	57.2332	386.8081	6.758
55	50.4833	336.3248	6.662
56	44.4866	291.8382	6.560
57	39.1261	252.7121	6.459
58	34.3503	218.3618	6.357
59	30.1099	188.2519	6.252

TABLE VI.—*(Continued.)*

Age.	D.	N.	Annuity. a_x
60	26.3488	161.9031	6.145
61	23.0254	138.8777	6.031
62	20.0752	118.8025	5.918
63	17.4748	101.3377	5.799
64	15.1787	86.1490	5.676
65	13.1370	73.0120	5.558
66	11.3640	61.6480	5.426
67	9.79043	51.85758	5.297
68	8.41427	43.44331	5.163
69	7.20803	36.23528	5.027
70	6.15261	30.08267	4.889
71	5.24095	24.84172	4.740
72	4.43559	20.40613	4.601
73	3.74390	16.66223	4.451
74	3.14515	13.51708	4.298
75	2.63383	10.88325	5.132
76	2.19371	8.68954	3.961
77	1.81768	6.87186	3.781
78	1.49768	5.37418	3.588
79	1.22656	4.14762	3.382
80	0.993741	3.153880	3.174
81	0.796531	2.357349	2.960
82	0.628533	1.728816	2.751
83	0.486101	1.242715	2.557
84	0.364437	0.878278	2.410
85	0.278221	0.610057	2.275
86	0.193608	0.416449	2.151
87	0.137232	0.2792173	2.035
88	0.0950143	0.1842030	1.939
89	0.0657170	0.1184860	1.803
90	0.0451462	0.0733398	1.625
91	0.0308972	0.0424426	1.374
92	0.0201941	0.0222485	1.102
93	0.0124656	0.0097829	0.785
94	0.0064924	0.0032905	0.507
95	0.0026718	0.0006187	0.232
96	0.0006187	0.0000000	0.000

TABLE VII.—*Annual Premia for Assurances.*
Four per Cent.

Age.	One Year.	Two Years.	Three Years.	Four Years.	Five Years.	Six Years.	Seven Years.	Whole Life.
20	.01620	.01621	.01623	.01628	.01639	.01646	.01654	.02356
21	.01626	.01629	.01637	.01642	.01648	.01659	.01669	.02405
22	.01633	.01642	.01646	.01662	.01666	.01677	.01685	.02457
23	.01648	.01657	.01663	.01676	.01689	.01696	.01707	.02513
24	.01665	.01681	.01693	.01698	.01709	.01720	.01732	.02372
25	.01697	.01700	.01709	.01718	.01728	.01746	.01761	.02633
26	.01702	.01717	.01728	.01741	.01757	.01773	.01790	.02698
27	.01733	.01743	.01756	.01773	.01790	.01808	.01826	.02768
28	.01753	.01768	.01788	.01806	.01826	.01845	.01863	.02841
29	.01785	.01808	.01826	.01847	.01867	.01891	.01907	.02920
30	.01832	.01849	.01870	.01890	.01909	.01932	.01958	.03002
31	.01867	.01892	.01912	.01932	.01955	.01984	.02023	.03088
32	.01917	.01936	.01955	.01981	.02012	.02045	.02081	.03179
33	.01955	.01981	.02005	.02039	.02076	.02115	.02154	.03274
34	.01992	.02031	.02070	.02111	.02152	.02195	.02242	.03375
35	.02067	.02110	.02153	.02197	.02242	.02292	.02340	.03466
36	.02156	.02201	.02247	.02293	.02346	.02396	.02448	.03594
37	.02249	.02297	.02345	.02402	.02454	.02508	.02563	.03708
38	.02348	.02398	.02460	.02514	.02571	.02629	.02684	.03830
39	.02452	.02521	.02577	.02637	.02697	.02755	.02812	.03953
40	.02595	.02645	.02706	.02769	.02828	.02887	.02944	.04080
41	.02705	.02769	.02834	.02897	.02959	.03018	.03078	.04207
42	.02844	.02910	.02973	.03036	.03096	.03158	.03218	.04339
43	.02982	.03044	.03109	.03171	.03236	.03298	.03356	.04473
44	.03139	.03180	.03244	.03312	.03376	.03435	.03495	.04608
45	.03253	.03317	.03389	.03455	.03515	.03577	.03637	.04756
46	.03386	.03465	.03532	.03594	.03658	.03720	.03744	.04887
47	.03549	.03614	.03675	.03740	.03808	.03861	.03920	.05031
48	.03685	.03745	.03814	.03880	.03939	.04001	.04061	.05175
49	.03811	.03886	.03957	.04016	.04080	.04144	.04198	.05323
50	.03968	.04039	.04097	.04163	.04228	.04284	.04342	.05475
51	.04116	.04169	.04239	.04308	.04364	.04425	.04485	.05630
52	.04228	.04309	.04384	.04441	.04504	.04567	.04627	.05788
53	.04397	.04473	.04525	.04589	.04655	.04717	.04777	.05955
54	.04555	.04597	.04665	.04734	.04799	.04862	.04920	.06125
55	.04644	.04728	.04806	.04875	.04942	.05002	.05067	.06300
56	.04814	.04898	.04968	.05035	.05096	.05163	.05226	.06485
57	.04983	.05052	.05121	.05182	.05253	.05324	.05385	.06677
58	.05127	.05194	.05262	.05338	.03406	.05476	.05552	.06875
59	.05280	.05340	.05422	.05494	.05569	.05651	.05727	.07086
60	.05406	.05505	.05581	.05661	.05736	.05835	.05919	.07308

PROCEEDINGS

OF THE

ASIATIC SOICETY OF BENGAL

FOR MARCH, 1850.

The usual monthly meeting of the Asiatic Society was held on the evening of the 6th March.

J. R. COLVIN, Esq. Member of the Council, in the chair.

The proceedings of the last meeting were read and confirmed.

Notes were recorded from Mr. Brandreth, Captain Baseley, Major Hannay and Capt. Staples withdrawing from the Society.

The following gentlemen were named as candidates for election at the April meeting.

C. T. Watkins, Esq.,—proposed by Mr. Heatly, and seconded by Mr. Blyth.

A. J. M. Mills, Esq. B. C. S.,—proposed by J. R. Colvin, Esq., and seconded by Dr. W. B. O'Shaughnessy.

T. Morton, Esq. Madras Medical Service,—proposed by J. R. Colvin, Esq., and seconded by Dr. W. B. O'Shaughnessy.

Hon'ble Capt. R. B. Byng,—proposed by Dr. O'Shaughnessy, and seconded by J. R. Colvin, Esq.

The Rev. Principal Kay of Bishop's College,—proposed by Rev. S. Slater, and seconded by F. E. Hall, Esq.

Letters were read—

1. From the Secretary to Government, Home Department, forwarding a plan of the city of Jagannath.

2. From Mr. Bowring, C. S. submitting a description of the Shekim district.

3. From H. Torrens, Esq. forwarding a plan and drawing of the Adiná Masjid.

It being stated that this monument is rapidly falling to ruin, it was agreed unanimously that the Society make a representation to Government, soliciting that measures be taken for its repairs and its preservation.

4. From Dr. Wise, forwarding a Bengali history of Tipperah. Referred to the Oriental Section. (And since the meeting, at Dr. Wise's request, made over for examination to Mr. Jones.)

5. From Mr. Laidlay, forwarding a series of maps, illustrative of his version of a Chinese treatise on the river courses of the countries West of China Proper.

6. From Mr. Laidlay, tendering his resignation of the office of Joint Secretary.

On the proposition of the Honorable President and the Council, the Society unanimously decided to place on record, "their grateful sense of the valuable services Mr. Laidlay has rendered to the Society, and of the happy combination of zeal, ability learning, and temper with which he has so long discharged the functions of Joint Secretary and Editor of the Journal."

It was further and unanimously voted that Mr. Laidlay's resignation be not accepted, and that he continue, during his absence, to be Joint Secretary to the Society.

Read again the resolution respecting Col. Forbes' retirement from the list of Vice-Presidents, proposed by Mr. Colvin, and seconded by Capt. Broome, at the January meeting—

"That as a testimony of the great respect and esteem of the Society Col. Forbes be elected an Honorary Vice-President of the Society (on the occasion of his retirement from the list of active Vice-Presidents) as was done on the retirement of Mr. H. Torrens."

Unanimously carried.

Read a letter from the Statistical Section communicating their desire to apply to Government for permission to consult certain records—also

a memorandum of the approval of the Council of the proposition submitted by the Section.

SIR,—We have the honour to request that you will be pleased to lay before the Society, with a view to its being forwarded, if approved of, the undermentioned suggestions of the Section appointed by the Society for the advancement of Statistical Science in India.

At a meeting of the Section the various means of obtaining Statistical Information were attentively considered, and it was proposed by Captain Staples and resolved unanimously that, as the resources at the command of the Section are very limited, and as the records in the office of the Government of Bengal are considerable, the Secretary of the Society be requested with sanction of the Society, to solicit Government to permit the Index of the papers now in the Bengal Secretariat Office, to be copied or published by the Society, and subsequently to permit such papers as the Society may consider valuable, and the Government may please to authorize, to be published or extracts taken from them; and secondly that the members of the Section or other properly authorized persons, be permitted access to the records or such portion of them, as the Government may be pleased to place at their disposal for the above purpose.

We have the honor to be, Sir,
Your most obedient servants,
N. A. STAPLES, *Br. Captain, Artillery.*
JAMES LONG, C. L. K.
S. G. T. HEATLY.

March 27th, 1850.

Unanimously adopted.

Mr. Piddington brought forward a resolution respecting lending of Books and MSS. and copying of MS.

The Librarian having submitted his usual monthly report, the meeting adjourned.

Confirmed, J. W. COLVILE, President.
W. B. O'SHAUGHNESSY, *V. P. and Secy.*

3rd April, 1850.

LIBRARY.

The following books have been received since the last meeting.

Presented.

Elements of Electro-Biology, or the Voltaic Mechanism of man; of Electro-Pathology, especially of the Nervous System; and of Electro-Therapeutics. By Dr. Alfred Smee.—PRESENTED BY THE AUTHOR.

The Report of the British Association for the advancement of Science, for 1848.—By the Association.

Bulletin de la Societé de Géographie, 3me, serie, Tome X.—By the Society.

An Apology for the Present System of Hindu Worship, Calcutta, 1817, 8vo.—By H. Piddington, Esq.

The Loghu Kaumudí, a Sanskrita Grammar, with an English Version. Part. I. By Dr. J. Ballantine.

Indische Alterthumskunde. Von C. Lassen. Zweiter Band. Geschichte von Buddha bis auf die Gupta-Konige. Bonn, 1849, 8vo.—By the Author.

Verhandelingen van het Bataviaasch Genootschap von Kunsten en Wetenschappen. Deel XXII.—By the Batavian Society of Arts and Sciences.

Œuvres de La Place. Tome VII. Theorie Analytique des Probabilites, Paris, 1847, 4to.—By the Editor.

The White Yajus Veda, edited by Albrecht Weber. Part II. The Satapatha Bráhmaṇa in the Mádhyandiní Sákhá, with extracts from the Commentaries of Sáyana, Harisvámin and Dvivedaganga, Berlin, 1849.—By the Editor.

Druckfehler, Berichtigungen und Nachträge zum ersten Bande.—By the Editor.

Barometrographia: Twenty years variation of the Barometer in the Climate of Britain, exhibited in autographic curves with the attendant winds and weathers, and copious notes illustrative of the subject. By Luke Howard, Esq. London, 1847, Rl. folio.—By the Author.

Zeitschrift der Deutschen morgenlandischen Gesellschaft, herausgegeben von den Geschafts führen. Drittes Band, II. und III. Heft.—By the Editors.

Journal of the Royal Geographical Society of London, Vol. XIX. part I. —By the Society.

Transactions of the Royal Society of London for the year 1847.—By the Society.

Proceedings of the Royal Society of London, Nos. 68-72.—By the Same.

List of the Fellows of the Royal Society, 1847.—By the Same.

Address of the most noble the Marquis of Northampton, the President, read at the General Meeting of the Royal Society on Tuesday, June 9th 1848.—By the Same.

Journal of the Indian Archipelago for January, 1850.—By the Editor.

Ditto ditto, 2 copies.—By the Government of Bengal.

Upadeshaka, No. 39.—By the Editor.

The Oriental Baptist, No. 39.—By the Editor.

The Calcutta Christian Observer for March, 1850.—By the Editors.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of January, 1850.—By the Deputy Surveyor General.

Tattvabodhiní Patriká, Nos, 78-9.

Purnachandrodaya, for February, 1850.—By the Editor.

Exchanged.

Journal Asiatique, Nos. 61-4.

Journal of the Royal Asiatic Society, Vol. XI. Part I. and Vol. XII. Part I.

Quarterly Journal of the Geological Society, Nos. 18-19.

Jameson's Journal, No. 93.

Purchased.

Comptes Rendus, Nos. 16 @ 21.

Histoire Naturelle des Poissons, Tome XXII.

Haji Khalfæ Lexicon Bibliographicum et Encyclopaedicum, Vol. V.

The Annals and Magazine of Natural History, for December, 1849.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of March, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.981	65.2	65.8	65.0	S. E.	Clear	30.034	76.8	77.4	72.6	S. W.	Cumuli	29.983	83.3	83.8	72.0	W.S.W.	Clear
2	.966	70 7	71.2	70.4	S. S. W.	Ditto	.020	79.2	80.0	68 2	W. S.W.	Clear	.975	85.8	86.0	68.0	W.S. W.	Ditto
3	.896	70,8	71.0	70 0	S. S. W.	Ditto	29.943	81,6	82.3	70,3	S. W. sp.	Ditto	.880	90,0	90.7	70.8	S. sharp.	Ditto
4	.852	68,7	68.5	61.0	S. W.	Ditto	.920	81.5	82.3	66.2	W.	Ditto	.867	89.0	89.0	67.0	W N.W.	Ditto
5	.905	65,0	64.8	60.0	W.	Ditto	.970	82.2	83.0	63.2	W.N.W.	Ditto	.925	87.0	87.2	62.9	W. sharp	Ditto
6	.866	66.4	66.8	66.0	W.	Ditto	.933	80,0	81.0	68.6	N. W.	Ditto	.882	88,7	87.9	66.0	W.S. W.	Ditto
7	.889	67 1	67.2	65 2	N.	Ditto	.963	81,0	83.0	73.2	E. S. E.	Ditto	.912	90,9	90.5	69.2	W.S. W.	Ditto
8	.883	67.1	67.2	62.9	S. W.	Ditto	.928	81,3	82.8	68.6	S. W.	Ditto	.877	92.0	92,5	68.2	W.	Ditto
9	.817	71,8	72.2	71.7	S. W.	Foggy	.867	80,0	80.7	74.0	S. W.	Ditto	.824	90.1	89.9	70.2	W.	Ditto
10	.735	69.3	69.8	64.3	WN.W.	Clear	.802	85,0	85.4	67.0	W.N W.	Ditto	.764	90.3	89.8	65.8	ws.w.sp.	Ditto
11	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
12	.780	74.2	75.0	73 0	S.	Cloudy	.828	81.6	81.3	75 8	S.S. W.	Clear	.795	89.2	88.7	76.0	S. S. W.	Clear
13	.770	75.7	76.0	74.0	W.	Ditto	.794	83.7	82.8	75.5	S.S. E.	Cirro-cumuli	.780	89.3	89.2	76.3	S.	Cirro-cumuli
14	.771	71.8	72.2	71.2	S. E.	Ditto	.832	82.9	83 0	77.7	S. S. W.	Cumuli-strati	.790	87.6	85.4	77.5	N. W.	Cumuli
15	.816	75.0	75.5	74 2	S. E.	Ditto	.857	83.8	83 8	77.0	S. S. W.	Cumuli	.822	88 2	88.0	78.0	S. S. W.	Ditto
16	.858	69.4	69.7	68.2	E. S. E.	Cirro-cumuli	.915	79.3	80.0	74.8	S.	Ditto	.883	86.3	85.3	76.7	S. S. E.	Ditto
17	.974	67.3	67.8	65.5	E. N. E.	Cloudy	30 053	71.5	71.5	68 3	N.	Cloudy	30.019	68.3	69.0	67.2	N. E.	Rain &thundg.
18	30.010	66.3	66.5	65.5	N.	Cumuli	.071	77 6	75 9	70 2	N. E.	Clear	.020	82.0	81.0	70.3	N. W.	Clear
19	.037	68.8	69.2	68.9	N. E.	Foggy	.085	80.5	80.2	75.2	E.	Cumuli	.041	87.0	85.7	71.2	S.	Cumuli
20	29.974	69.6	70.3	69.0	S.	Clear	.021	81.7	81.4	74.4	S. W.	Ditto	29.979	86.3	86.2	74.7	S. W.	Ditto
21	.901	72,0	72,4	71.3	S. W.	Ditto	29.965	82.8	83.0	76.0	S. W.	Clear	.909	89.7	89.8	77.0	W.	Clear
22	..	..	..	..	....	.....	.917	83 3	82.5	75.5	W.S. W.	Ditto	..	..	..	..	....	....
23	.952	69.8	70.3	66.0	W N.W.	Ditto	30 023	87.1	86.9	71.9	N.N. W	Ditto	.985	93.0	92.2	68.5	N. W.	Ditto
24	30.000	69 3	69.7	63.7	N. W.	Ditto	.058	89 2	88.8	69.0	S. W.	Ditto	80.025	93.7	92,8	66.8	S. S. W.	Ditto
25	29.997	72.0	72.8	70.7	S. W.	Cirro-strati	.063	84,5	84.4	73.2	W.	Ditto	.025	91,3	90,8	71.5	S. W.	Cumuli
26	.985	71.8	72.0	70.3	S. W.	Clear	.047	85.3	85.0	74.0	S. W.	Ditto	.009	92.7	93.0	74.2	S. W.	Clear
27	.987	72 2	72.9	70.2	S. W.	Ditto	.045	85.8	85.6	74.2	S. W.	Ditto	29.994	92.3	92.3	72,1	S. W.	Ditto
28	.939	72.9	73,0	71.3	N. E.	Ditto	29.971	85 8	85.9	78.0	S. W.	Ditto	.921	93,8	94,0	78.3	S. W.	Ditto
29	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
30	.863	76.2	77.0	75.0	N. E.	Cumuli	.897	87.0	85.3	75.3	N. W.	Ditto	.864	91.6	90.6	74.2	N.N.W.	Cirro-cumuli
31	.874	75.6	75.8	73.0	S. E.	Clear	.917	89.0	87.5	68.3	N.N.W.	Ditto	.862	92.3	91,8	69.2	N.N.W.	Clear
Mean	29.903	70.4	70 8	68.5	....	.....	29.924	82.4	82.5	73.8	....	....	29.915	88.6	88,3	69,2	....	....

[*Meteorological Register, continued.*]

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. 40. Upper.	Feet. 4. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.894	88.0	88 3	65 8	NNW	Clear	29.873	88.8	87.9	65.0	WSW	Clear	29.899	81.2	80.0	76.2	S.SW.	Clear	89.1	77.4	65.7	..	..	..		1
.899	89.0	88.1	66.7	NNW	Ditto	.882	89.3	88.0	65.5	N. W	Ditto	.893	83.8	82 3	66.7	N.	Ditto	90.6	80.5	70.3	110.0	..	..		2
.809	92.9	92.2	72 0	SWsp.	Ditto	.795	91.3	90 0	70.8	S. sp.	Ditto	.809	84.0	82.7	72.8	S. W.	Ditto	94.0	82.5	71.0	104.3	..	..		3
.802	91.0	90.0	66.3	W.	Ditto	.776	91.0	89.8	65.0	w.nw.	Ditto	.787	84.0	82.3	66.2	w.s.w.	Ditto	92.4	80.6	68.8	107.0	..	..		4
.828	90.2	90.0	64.7	WSW	Ditto	.806	90.8	89 8	65.2	w.nw.	Ditto	.809	85.5	84.0	65.6	W.	Ditto	92.0	78.7	65 4	107.3	..	..		5
.812	91.2	90.7	68.4	WSW	Ditto	.797	91.3	90.0	67.3	W.	Ditto	.809	86.1	83.7	71.9	WSW	Ditto	92.9	79.9	66.8	109.4	..	..	☾	6
.839	93.3	92.7	67.8	WSW	Ditto	.828	93.4	92.2	67.2	W.	Ditto	.838	88.0	85.0	69.2	S. W.	Ditto	95.2	81.3	67.4	112.3	..	..		7
.777	95.0	94.3	67.8	W.	Ditto	.762	95.8	94.7	69.0	S. W.	Ditto	.777	89.0	87.5	67.6	S.SW.	Ditto	96.8	81.9	66.9	112.6	..	..		8
.729	95.0	94 3	70.6	S. W.	Ditto	.709	95.2	93.7	70.4	SS.W.	Ditto	.690	89.8	87.0	73.0	S.	Ditto	96.4	84.5	72 5	..	..	..		9
.678	92.7	92.1	67.8	W.	Ditto	.651	93.4	92.3	67.2	W.	Ditto	.664	88.0	86.5	68.3	S. W.	Ditto	94.8	81.7	68.5	..	..	..		10
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	..	..		11
.703	93.1	92.3	76.4	S.SW.	Clear	.691	92.2	91.0	77.0	S.SW.	Clear	.723	86.2	85.0	76.2	S.	Clear	94.3	84.6	74.8	..	..	..		12
.785	93.0	91.9	74.2	S.	Ditto	.661	93.9	92.2	74.2	S. W.	Ditto	.666	87.7	86.2	76.3	S. W.	Rainy	94.7	..	..	111.8	..	0.42		13
.712	91.3	90.8	77.4	S W.	Cumuli	.689	91.7	90.4	76.6	S. W.	Cumuli	.718	79.8	78.2	68.0	S. shp.	Cloudy	95.0	81.7	70.9	107.0	..	0.12	●	14
.751	88.8	87.6	77.8	SS.W.	Cumulo-strati	.729	86.3	85.6	76.2	S.	Cumulo-strati	.740	82.0	82.2	76.0	S.	Ditto	90.2	82.1	73.9	100.4	..	..		15
.799	87.3	86.7	75.9	S.	Ditto	.851	81.0	75.2	65 6	SSW sp	Comcd. to rain	.833	72.8	71.0	68.0	N. W.	Ditto	89.7	79.3	68.8	100.0	..	0.88		16
.955	78.6	78.7	72.7	N. E.	Cirro-cumuli	.925	79.3	78.0	70.3	E.	Scatter'd clouds	.922	77.0	75.8	70.0	E.S.E.	Cirro-cumuli	80.8	74.1	67.3	97.2	..	0.10		17
.949	86.1	85.3	70.2	N.	Clear	.937	86.0	84.6	66.0	NNW	Clear	.954	82.0	80.6	67.7	N.	Clear	87.7	77.1	66.4	107.4	..	..		18
.956	89.9	88.4	71.2	S. W.	Cumuli	.940	89.8	87.5	71.2	S. W.	Cumuli	.937	86.2	83.4	72.3	S.	Cumuli	90.5	79 6	68.6	109.8	..	..		19
.885	90.3	90.0	70.7	W.	Clear	.876	90.2	89.2	69.0	NNW	Clear	.868	85.0	83.0	71.8	N. W.	Clear	90.1	80.5	69.9	108.8	..	..		20
.827	93.2	92.6	72.2	S. W.	Ditto	.807	93.8	92.2	72.5	S. W.	Ditto	.813	87.0	85.8	70.6	S.	Ditto	94.6	83.4	72 2	111.8	..	..		21
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	94.9	85.0	75 0	..	..	..	☽	22
.926	95.3	94.3	67 8	N. W.	Ditto	.907	95.0	93.0	66.6	N. W.	Clear	.923	88.8	86.0	70.0	N. W.	Ditto	96.8	83.5	70.2	115.4	..	..		23
.946	95.9	95.3	70.0	S.	Ditto	.932	96.2	93.8	68.3	S.	Ditto	.930	90.2	87.0	72.0	S.SW.	Ditto	97.9	83.9	69.9	115.0	..	..		24
.948	94.3	93.6	73.8	W.	Cirro-cumuli	.921	95.2	92.7	69 4	N. E.	Cirro-cumuli	.916	90.0	87.9	72.5	S.	Cirro-strati	96.5	84.8	73 0	114.0	..	..		25
.932	97.0	96.3	72.3	S. W.	Clear	.917	97.3	95.8	71.8	S.SW.	Clear	.933	88.8	87.3	68.2	S.	Clear	98.9	85.5	72.0	111.8	..	..		26
.910	95.4	94.8	76.7	SS W.	Ditto	.895	95.0	93.3	75.5	S.	Ditto	.908	88.0	86.7	69.0	S.	Ditto	97.6	85.3	73.0	108.0	..	..		27
.839	99.0	98.0	74.3	w. nw.	Ditto	.811	99.0	97.0	71.0	N. W.	Ditto	.807	92.0	90.0	76.2	N. W.	Cirro-strati	100.4	86.7	73.0	120.0	..	..		28
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	98.3	87.1	75.8	..	..	..	⊙	29
.796	95.3	94.5	75.0	NNW	Cirro-cumuli	.762	96.0	94.5	74.3	N. W.	Cumuli	.785	92.0	90.8	72.6	w.n.w.	Cumulo-strati	97.0	87.0	77.0	112 0	..	..		30
.791	95.2	94.0	70.5	NNW	Clear	.770	95.5	92.4	69.9	E.	Clear	.778	90.8	88.8	74.0	S.	Clear	97.0	86.5	76.0	112 5				31
29.835	92.1	91.4	71 3	....	....	29.818	91 9	90.2	69.9	....	...	29.826	85 9	84.2	71.0	....	....	93.9	82.3	70.7	109.4	..	1.52		

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JOURNAL

OF THE

ASIATIC SOCIETY.

No. IV.—1850.

Extracts from Dr. Voysey's *Private Journal, when attached to the Trigonometrical Survey in Southern and Central India, No. III.*

Saturday, 20th February, 1819.—I passed through the village of Mengoor near which, on the banks of a small nullah, the thermometer sank to 47° just before sunrise : in its neighbourhood, I also saw a bed of lithomarge lying on the alluvium which rested as usual on the trap. The fields on my right and left were full of gram and corn crops ; nevertheless I observed that a large quantity of land had been thrown out of cultivation. The approach to the Godavery was over waving land consisting entirely of trap and alluvium ; now and then beds of amygdaloid with green earth and wacké were seen, and within a mile of the river small blocks of granite rising through the alluvium, so rounded, that I found it impossible to bring away specimens. My visit to the rocks was first paid ; I found them to consist of granite forming the banks and bed of the river, the former were about 40 feet high ; of this height the granite occupied one-half and the remainder consisted of black cotton soil ; the river was shallow indeed. I crossed its deepest part, and found it vary from 2 to 4 feet in depth, its bed consisting of granitic sand mixed with a few calcedonies and agates, and on the borders magnetic iron sand ; I did not see shells. In the crevices of the rocks I found some pieces of stilbite or radiated zeolite. The height to which the river rose two years ago, was pointed out to me, it might be about 30 feet above its present level : it had washed away the corner of a wall surrounding a handsome pagoda built of black basalt :

it must now no doubt have changed its bed materially, since tradition places the pagoda many years ago, far from its banks. The temperature of the river at 12 o'clock was 74°, the same with the air. The basalt of which the pagoda is built is in some parts of the building finely polished. It contains olivine. The granite much resembles that found near Bachapilly at the Bear's rock. It is porphyritic containing large crystals of red felspar in a crystalline cement composed of quartz, compact felspar and mica. This is the prevalent rock. A porphyritic greenstone lies near it, apparently in beds, in which the crystalline felspar is compact and of a green colour arising from green hornblende? I believe them to be the same with those of the Bear's rock at Bachapilly. The distance from Thevalingapate hill is 12 miles and the sole rock is the trap, sometimes basaltic, sometimes wacké on the elevations, and in the plains black cotton soil.

Monday, 22nd February, 1819.—On quitting this place the thermometer stood at 47° and the temperature of water at 5½ o'clock A. M. was 43°; a march of 7 miles brought us to Monegal: nothing but trap of which I am heartily tired.

Tuesday, 23rd February, 1819.—The formations in this part of India differ materially from those of Europe; no chalk, no intermediate rocks between the trap and granite. The whole field of view, probably an extent of 20 miles. The ravines of the formation are much deeper than usual.

Sunday, 27th February, 1819.—Large beds of wacké began now to appear, generally lower, or at the bottom of the more elevated trap hills. On arriving near, a temple with a basaltic column similar to one I had seen on the banks of the Godavery struck me, and I made an attempt to draw it.

Monday, 28th February, 1819.—The river bed differed very little from that of the Mulinar. I followed it until I came to the same or a similar appearance, which had before struck me: large masses of red granite imbedded in a coarse cement of limestone, containing crystals of felspar quartz, &c. I drew a sketch of the banks which bore a great resemblance to those of the Mulinar and Manjera. We arrived at Buhtalipoor. In the evening I visited the formation of wacké, to ascertain a fact mentioned in Thomson's Annals, confirmed. It was not calcedony in wacké.

Tuesday, 1st March, 1819.—The configuration of the hills was

very striking, with the same form I have before noticed, fewer peaks, and lying at right angles to each other in many instances. Once or twice I observed a complete quadrangle all but one side, the opening being towards the plain.

Wednesday, 2nd March, 1819.—A rugged road from the frequent ascent and descent of the trap hills. On one of them I observed a vein of quartzose rock passing into flint running E. and W. I crossed the Scinde; the bed consisting entirely of black trap or basalt, very compact. At Dapky I lowered the temperature of Fahrenheit from 92° to 62° at sunset. I noticed a bed of lithomarge on my road.

Thursday, 3rd March, 1819.—The hill on which the flag is fixed about four miles and a half from Oudeghir, is covered with calcedony amorphous, cellular with impressed crystals, and striped mammillary onyx, some imbedded in the cavities of the basalt; amongst them I found one piece of green amorphous calcedony. Five hundred yards from the tent, I saw on the side of a hill, exposed by a slip, imperfect columns of basalt resembling precisely the description in Thomson's Annals; the Rowley Rag basalt. Oudeghir (the fort) stands on one of the flat hills so frequently mentioned surrounded on every side by the semi-columnar basalt.

Friday, 4th March, 1819.—I rode through the town of Oudeghir, which is entirely built of basalt. It is the largest native town I have seen, some of the streets wide and the houses neat. My sketch of the hills to the northward of the fort, when seated on a neighbouring hill on a level with it, is the best I could take; it ill represents the singular rise one above the other of the basalt: the hills representing to the eye an appearance of distinct strata, which reminds me of the Isle of France; beds of carbonate of lime are very frequent. I noticed on my way semi-columnar basalt in a large deposit to the left of the town.

Saturday, 5th March, 1819.—In the evening I rode to the right of the town and came to something very much resembling the iron clay, not very dissimilar to that of the Cape of G. Hope.

Sunday, 6th March, 1819.—In the evening I rode to the basalt; I found one column, of 8 sides, more than a metre in diameter, the interstices were filled with green earth and sometimes with the globular wacké. In some of the columns I noticed depressions and elevations for the reception of a corresponding piece as in the Giant's Causeway and Staffa.

To the westward and southward all the hills have the same appearance, and I have no doubt that they are the same formation.

Monday, 7th March, 1819.—I wandered over some hills to the left of Oudeghir, where I found trap tuff, wacké and carbonate of lime (tuffaceous) in abundance, containing crystals of zeolite apparently of fresh formation. At the bottom semi-columnar basalt very black and of great specific gravity; on the right of the town, there are very extensive ruins of houses and other buildings. The stream which struggles through the valley is fed by the infiltration from the hills. We passed on our road to Doongong, over many pavements of basalt, some of them semi-columnar with the interstices filled up by a secondary formation or injestion of basalt; we saw also two remarkable elevations nearly north and south. In the neighbourhood of Doongong, vast quantities of wacké and basalt and trap tuff, alternating frequently and without order.

Wednesday, 9th March, 1819.—The land is waving as usual with a few abrupt acclivities from two to three hundred feet in height. The trap appears less subject to decomposition, having a very thin coat of soil, and in many parts, it was found impossible to drive in the tent pegs.

Thursday, 17th March, 1819.—I found on the road the basaltic trap as usual, and in the neighbourhood of a ruined building some of the iron clay in lumps, apparently brought from some distance.

Saturday, 19th March, 1819.—Reached Dammergidda at sunrise and proceeded to the Manjera, which I crossed and encamped at Chillelah in sight of Beder, distant about 5 coss seated on a hill. The left bank is of the black alluvium, about fifteen or twenty feet high, sometimes much less: the right bank rises to upwards of 60 feet in height, forming a hill of considerable size on which Chillelah is seated; the bank is composed of large masses of an earthy and crystalline brown limestone very much waterworn and containing large cavities which appear to have been formerly filled by pieces of wacké, in some places containing large masses of flint, and in others forming a compound rock being a cement to a rocky compound of wacké basalt, clay and flint. Near the upper part it has the appearance of regular stratification, and on its top wacké easily decomposable is spread over it. I have yet to observe it more closely. The carbonate of lime contains a small portion of alluvium.

Sunday, 20th March, 1819.—I bathed twice and collected on the bank of the river a large quantity of the iron sand, which I suppose to contain iron ore, very little of it being taken up by the magnet. I also found very fine clay. I took a ride in the evening and a sketch of the hills near Beder.

Monday, 21st March, 1819.—I took a more accurate survey of the banks of the Manjera in the neighbourhood of Chillerjee. The confusion or mixture of the two rocks is much greater than I at first imagined. I noticed close to the present level of the river, a rock of compact basalt which at the distance of three or four feet becomes wacké, passing into the admixture of carbonate of lime and lumps of wacké, and that again into the porous limestone containing clay, and green earth, presenting externally large cavities out of which those substances have been washed; above the limestone is a brownish wacké on which the town is built; the height of the whole is about 40 or 50 feet: the banks below and above were composed of the black alluvium, but I was told the limestone was found in considerable quantity both above and below. The height of the river was rather distinctly marked during the rainy season, by the impression it had made on the foundations of a mosque built on its bank.

Tuesday, 22nd March, 1819.—A short distance from the hill on which Beder stands, the soil gradually changes from black to a reddish tinge from the decomposition of the iron clay of the range of which and on which Beder is built. This is the greatest elevation of the iron clay that I have seen in India, the barometer indicating 2000 feet above the level of the sea. In some places particularly in those excavations near the fort, it resembles very much the iron clay of Nellore containing in its vesicles Lithomarge, and the wells are generally very deep, one measured 40 cubits; the temperature of the water was 78°. The iron clay contains lithomarge as usual and it approaches a plumb blue colour. I ascended the tower on which the flag was, and could not avoid noticing the flatness of the isolated mountains which had before struck me in so many instances.

Wednesday, 23rd March, 1819.—I noticed greenstone, granite, and basalt in different parts of the building, which was chiefly composed of the iron clay and bricks.

Friday, 25th March, 1819.—I rode this morning down the hill into

the plain to the northward, the iron clay presented in no instance an appearance of stratification, but I noticed in several instances a gradual transition from it into wacké and thence into basalt, of which there are numerous little elevations in the neighbourhood. I noticed also lithomarge in considerable quantities, both in beds and in the rock itself, I re-ascended to the southward, finding the iron clay vary in form and in some instances degenerating into an ochery soft clay. It must be observed that the iron clay itself is very soft when first quarried and becomes indurated on exposure to the air. To the south-east a curious sight presented itself in the form and disposition of the hills, of which I made a sketch taken in a different direction; the flattened summits were here most distinctly seen with the bevelments of the usual angle; around these were several small conical summits entirely isolated, some on the contrary were of a flattened rounded form, intermixed, consisting evidently of basalt.

Saturday, 26th March, 1819.—I recommenced my observations on the hill of Beder, and this morning rode to the north-westward. I every where saw the basalt at the foot of the hill passing into wacké and iron clay, in one place the transition did not occupy more than three feet and was very distinct. This easily explains the depth of the wells in the fort and the tower; the very porous iron clay being unable to hold the water it drips through until it meets with the basalt. It is proper here to observe that in most instances the vesicles or pores of the rock, had the appearance of long hollow tubes always vertical. The basalt was not confined to the valley but was found in a considerable number of elevations, of all forms, around. I observed on the western side several springs just above the level of the basalt. The singular improvidence and want of foresight in the builders of the fort was very evident in several places: finding the rock so very soft and easily worked they excavated, or rather cut it down even with the wall, it has subsequently mouldered and the wall has been precipitated with it. The high land projecting into the valley or plain through which the Manjera runs, like a number of buttresses resembling very much that at Sudghir, is seen to the westward; to the verge of the horizon to the eastward the hills have a more abrupt and irregular character. The magnetic needle did not appear to be affected by the iron clay rocks. I visited a manufactory of Beder bot-

toms ; the basis pewter, the design whether of flowers or other pattern is chiselled out of the black ground, by an instrument fitted for the purpose, a paper is pressed strongly over it which takes the sharp edges of the design, and this paper is placed on a thin sheet of *silver** for the purpose of cutting it into the requisite forms ; these are then inlaid and the edges of the pewter pressed down, so as to enclose the silver completely.

Sunday, 27th March, 1819.—Temperature of two springs on the N. W. side of Beder 76°, of neighbouring water 73°. I again examined the passage of the basalt into the iron clay. In some places the passage from the almost columnar basalt into nodular, and then into the iron clay is very distinct, on the other hand in other places the basalt appears to pass under it and in some instances forms a causeway in the path, at the side of which rises the iron clay.

Monday, 28th March, 1819.—I ascended the minaret and had a fine view of the country, the whole to the southward, eastward and westward had the appearance of a vast elevated plain ; to the north it terminates in the projecting buttresses of iron clay into the valley through which the Mayna runs and which is ten miles in breadth.

Tuesday, 29th March, 1819.—From Beder we began immediately to descend to that ground which appeared from the minaret to be an extensive plain ; consisting of numerous elevations and depressions, or a collection of several plains intersected by deep ravines. The whole consisted of iron clay, but on our road to Shelapilly four zones of the black cotton soil intersected our path running due north and south ; the difference was strongly marked. The iron clay soil was almost incapable of cultivation, and the other presenting its usual appearance of fertility. We are at present encamped on one of these zones, having a direction nearly north and south : at the foot of a conical elevation of 40 feet, composed entirely of earth from the top, the iron clay is seen on each side at the distance of $\frac{1}{4}$ of a furlong. Query, is this hill the focus whence this muddy eruption has issued ? One more is visible in the plain about 2 miles distance. The earth at the depth of two or three feet is sufficiently moist to allow it to be made into a ball with the hands. Temperature 5° below the atmosphere.

* Copper and silver nearly equal parts.

Wednesday, 30th March, 1819.—I visited the small hill I have before mentioned, and found reason to suppose it artificial. The black soil was in some places intermixed with the trap clay, and in others was in indistinct zones, all with N. or N. by W. direction.

Thursday, 31st March, 1819.—We descended from the iron clay during the night, and in the morning found ourselves on the black soil in a level plain. I found considerable quantities of carbonate of lime intermixed with the wacké which is here found in the same nodular masses with a hard kernel which I have before noticed at Banktapoo. The soil contained a large quantity of carbonate of lime effervescing considerably with acids.

Friday, 1st April, 1819.—I crossed three nullas on my road to Sedashewpett, during a journey in the dark, all running eastward along a ridge of gently undulating and sightly elevated land, as seen to the eastward as day broke, apparently a continuation of the Tandmanoo range, and taking the same direction. At day break I fell in with large masses of granite lying in the black soil, and in a ravine saw plainly that it formed the substratum covered with the cotton soil, although not in all parts, the soil being granite in the highest part. To the westward are seen the flat tops of the trap hills and the peculiar abrupt termination of the iron clay of Beder. The soil in which we are, is nearly all granitic. The intolerable heat of the day has prevented my excursions for some time past. The valley in which we are is hotter than at Hydrabad.

Monday, 12th April, 1819.—I traced the trap veins into the granite and farther east than I could follow it; it is precisely similar to that of Golconda, Suldapooram, &c. I nowhere observed it in contact and passing into the granite. It extends as far as the eye can reach in an easterly direction, sometimes forming considerable elevations, and at others, sinking beneath the surface, is scarcely visible.

Thursday, 22nd April, 1819.—Twenty-six grains of the green carbonate of lime were dissolved in nitric acid; result to be hereafter mentioned. About three miles to the N. W. of the cantonment I observed a long deposit of quartz rock. The whole of the above green lime was dissolved except $3\frac{1}{2}$ grains of green earth which remained behind on the filter.

Thursday, 29th April, 1819.—Specific gravity of calcedonic agate from the Godavery. 260.

6th May.—Specific gravity of Tandmanoor basalt, 2. 816.

11th May.—Specific gravity of flint from Medcondah, 2. 63.

13th May.—Epidote from Multapoor.

Sp. Gr.,..... 3. 312.

13th May.—Green hornblende from the Carnatic.

Sp. Gr.,..... 3. 243.

30th May, 1819.—Here commences my expedition with Everest during the rainy season.

4th June, 1819.—To the left of the road before reaching Hyderabad I observed a deposition or bed of quartz rock which I ascended, but was not able to discern its termination on either side, its direction was due north and south. The granite in the bed of the river Mussy was reddish inclining to grey. The evening closed too soon on me to allow of any observations before reaching the camp.

5th June, 1819.—I arose with the sun and ascended the hill which rises about 100 feet above our encampment. I observed a vein of the greenstone precisely resembling that of Golconda and Secunderabad, its direction E. and W. as usual. The granite is of a greyish colour, containing large crystallized masses of felspar of a similar colour to that observed at Ardinghy.

I no longer observe loggan stones, the granite is more compact and less liable to decomposition. About a mile from the station in a westerly direction, I observed a long vein or deposition of quartz rock running north and south, probably a continuation of that observed yesterday, also on the ground numerous small concretions of carbonate of lime.

6th June, 1819.—I quitted the camp early for Chitterghat. The granite was generally of the reddish grey colour, with loggan stones, but fewer than I have observed in other parts.

7th June, 1819.—We arrived at Ballapooram, distant 8 miles from our last station, the vein of greenstone was observed to our right running nearly east and west. At one period, it crossed our path and we lost sight of it; soon after at this place we had heavy rain during four hours.

8th June, 1819.—We passed through Hyattnuggur and saw a trap vein to the right of our road which accompanied us for a considerable distance: it re-appeared at Seringhur, on the side of a granite hill.

9th June, 1819.—The granite between Seringhur and Mulkapoor

we found to be at times very red and close grained. The trap vein was frequently in our path, but very much decomposed and by an inexperienced eye would not have been distinguished from the granite. At Mulkapoor it assumed its usual character.

This place is situated at the northern extremity of a valley about five miles in length by 1½ in breadth, the hills rise on each side to the height of nearly 600 feet, they are of granite, which for the most part is of a grey colour, containing large crystals of bluish grey felspar. The large trap vein crosses this valley which is nearly north and south, and disappears on the eastern side amongst the rocks. It is here of large dimensions and appears to contain large pieces of epidote, as I found large pieces of that mineral at its foot.

10th June, 1819.—I was one hour going to the top of the hill where a flag was fixed. I found the granite much whiter than that below, which contains hornblende and compact felspar.

The view was very much bounded by the mist, I observed a few loggan stones and the same irregular appearance of the rocks as in the neighbourhood of Hyderabad. The barometer stood at 10 o'clock at 29° 4′, thermometer 84°; below the hill at 70° 8′, thermometer 80°. In the evening I visited the trap vein, I found a considerable quantity of epidote, also a few pieces of amethyst quartz, the vein rises due E. and W. I was afraid to trace it on account of the tigers.

17th June, 1819.—I saw several veins of the trap running in a different direction from that usual to them, they appeared however to be continuations of that large one which I observed at Mulkapoor.

18th June, 1819.—On the road I observed several trap veins and deposits on the mountains, but was not able to inspect them more closely on account of the jungle. At this place two veins were observed, the one due E. and W. coming from a considerable distance, and a small one, on which was a pagoda, nearly at right angles to it, of small extent.

19th June, 1819.—I reached Secunderabad this morning, a remarkable vein at the Mussey, probably a continuation of that of Golconda.

Wednesday, 23d June, 1819.—The hill of Bowenghir consists of a mass of granite of about 4 miles in circumference and 800 feet* in

* By trigonometrical measurement 646 in height.

height. From the plain it presents a singular appearance, the whole surface being completely bare and rounded at the top, with large masses hanging at its sides, the remains of some concentric lamellæ, part of which have fallen or slipped into the plain. On it are numerous excavations, which serve as reservoirs for water, some of very considerable depth. The colour of the granite is a whitish grey and it contains mica in separate spots. At the top is a building of a square form, formerly a palace of one of the Golconda sovereigns, the "Kootub Shahs," whose dynasty commenced in 1512 and ended in 1574. Some of the blocks of granite of which it is built are twenty feet in length. Beams of teak thirty feet in length. I observed in different parts on the surface of the granite projections of a harder and less decomposable rock which may in many cases be the cause of the loggan stones which are found here, although few in number.

Monday, 12th July, 1819.—The country passed through, Oonperty, Motamughoor, Koelcondah, Mundrick, differs in no respect in its general and particular appearances from that previously visited. The veins of greenstone are more frequent, more irregular in their direction and less continuous at Koelkondah and its neighbourhood. I observed several on the sides of the loftier hills and others at the top of the lower; in most places it was of the common kind; at Koelcondah it is fine large grained, ringing when struck and containing rather more felspar than is usual. Between Koelcondah and Mundrah, the most remarkable features were the concentric structure of the granite, the lamellæ in some instance are ten feet in thickness, their dislocation seems to have been hastened by some earthquake. The granite was reddish grey, becoming black on the weather side. On the banks of the Mussey, I noticed a trap vein apparently much intermixed and confused with the granite. At this place Mundrah, two hills in the neighbourhood, present the tabular form, there is much granite of the syenitic kind and closely resembling that of Mulkapoor. Also considerable quantities of the trap and considerable debris of quartz from veins in the granite. I have observed in many places a curious breccia of limestone, felspar, and quartz; it in some instances, resembles that on the bank and bed of the Seendy containing large blocks of granite; I have not observed it in any quantity as yet; the soil however in many places is impregnated with carbonate of lime.

Close to the base of the hill on which the instrument is fixed, a rock is broken in half by some convulsion and discovers two rounded masses of a very micaceous granite, differing remarkably from that in which it is contained, with very distinct edges, and intersected by two or three veins of granite similar to that of the containing rock. In one place the separation or slight adhesion of the two surfaces has allowed the rounded pieces of micaceous granite to fall out, leaving a hollow, such as is seen in a sandstone breccia, or pudding-stone, where the decomposition of the cement has bared the surface of the contained pebble, or angular mass, and allowed it eventually to fall out. I have long suspected that I should at least be able to prove to a certain extent that these masses which I have observed at Seeporty, at Nelgondah, Secunderabad and in other parts of this district are of anterior date. I have called it a crystalline micaceous green-stone, it is however, so small grained that I cannot now discern in it any hornblende, I shall therefore, consider it a very micaceous granite of a dark grey colour. My reasons for considering this granite to be of anterior date to that which encloses it are the following.

1. Its defined margin which distinguishes it from those veins of quartz and felspar in granite, which generally pass from one substance to the other by insensible degrees.

2. Its very different composition, the one being principally mica and quartz of a small grain rendering it very black and tough, the other an aggregate of quartz and felspar of a fresh colour and in rhomboidal crystals with a very small quantity of mica.

3. Its rounded appearance, as if it had been previously subjected to the action of some mechanical cause rounding its angles.

4. The veins of granite of the same nature with that of the containing rock and running from it through the mass.

In the immediate neighbourhood of this singular rock is a vein of the common greenstone, or rather an irregular mass without any traceable direction, since it disappears at a short distance, apparently concealed by the debris of the granite. The granite has the aspect of having suffered violent disturbance, immense masses being strewed on all sides of the rock abovementioned.

Near to the hill station is a very remarkable hill of about 500 feet in height, its tops consisting of tabular granite; its southern aspect

presents a regular but rather precipitous slope; whilst its southern one is irregular and almost perpendicular to the upper half.

Wednesday, 14th July, 1819.—I ascended the singular hill mentioned on the other side. The difficulty was very great, and I do not think I should have been able to have descended without the assistance of my bearer. Every haunt of banditti that I have ever read of, falls short of the comparison with this singular place. One man well supplied with provisions might easily defend himself against as many as could be sent against him. The passes are so numerous and the rock is so perpendicular, that it would be impossible to watch the one or scale the other. In one place a stone ready placed to close the orifice, would completly bar all farther progress. My guide informed me that it was formerly a haunt of very powerful banditti, and we saw on our arrival at the top, bricks, mortar, and in a crevice of the rock an inclosure forming a spacious apartment. The rock is entirely granite, of the same constituents as those of the rock beneath, containing rather less mica and with veins of quartz and felspar; on the pinnacle I observed in numerous shallow places containing rain water, tadpoles and other reptiles, for whose existence in such a place I am at a loss to account.

Sunday, 18th July, 1819.—I observed on the road numerous flattened masses of granite containing micaceous granite similar to that at Mundrick; sometimes very much intermixed with it, giving it a veiny appearance, at others rounded, presenting the same appearance as that before noticed; none rose far above the surface, the whole closely resembled that of Bachapilly containing small portions of carbonate of lime, the hornblende being a little darker in colour, large and small veins of the trap as usual and nearly in the usual direction.

Monday, 19th July, 1819.—We crossed the Mussey this day. I found in its bed shells resembling those found in the silicious stone of Medcondah. The river was not three feet deep, and its bed was composed solely of granite sand.

Tuesday, 20th July, 1819.—I this morning ascended the hill of Udirgutt with Everest. The granite blocks of which it is composed resemble principally the Bachapilly kind, containing pieces of hornblende, which are seen in four or five places of a mass about 3 feet in diameter. I found crystals of quartz in abundance in an alluvial soil washed down

from the hill. At its foot were vast quantities of granite, bared, mixed in all possible ways with the greenstone, exactly like Bachapilly.

30th July, 1819.—The whole of the granite in this neighbourhood is alike; the bottom consisting of the greenstone and micaceous granite intermixed with the granite in veins, blocks, &c., the resemblance of which to a stream of lava is very great and the course being always from the upper to the lower level. On this is placed the concentric lamellar granite containing small and large masses of crystallized hornblende. On this are masses with their interstices vertical, decomposing gradually and forming loggan stones, of which many are actually formed; some on the concentric granite ready to fall as soon as the decomposition of the lower surface has changed their centre of gravity.

6th August, 1819.—Just before our arrival at Singharam, we passed through a very considerable deposit of the trap the extent of which I was unable to trace from the thickness of the jungle. We passed over it for about a furlong; I observed in the river both trap and granite in large blocks.

7th August, 1819.—We passed through a very thick jungle formed principally by thorny mimosas, attended by the granite as usual; when arrived at about half our distance, without any perceptible transition, a slaty rock appeared in our path, and from the elephant's back I observed a flat platform nearly parallel with our path of about a mile in length. I walked to it and found it to consist of brownish red clay-slate, of a kind which would be useful in roofing houses. Its termination was at a nullah, in the bed of which I observed granite of a porphyritic texture passing into a rock resembling large grained sandstone, which became clay slate of the kind before mentioned. There existed no separation or line of distinction between these three rocks, and I had a fair opportunity of observing them from the lower side of the nullah of the opposite high bank in which the passage was distinctly visible. At this nullah it ceased and the usual rock granite continued to appear at intervals. About four miles from the Kishiar at the place called Piedderee, the horizontal limestone before mentioned (see page 198) made its appearance; it differed in no respect from that formerly described: it is, except its colour, a little darker than that on the banks of the river at Warripilly. Everywhere was seen detached pieces of the pudding-stone enclosing rounded and smooth

lumps of sandstone. In the few instances in which this was attached to the rock, they were found in the interstices or in those parts exposed to the action of the sun and the rain. In all places vast quantities of the debris were found in the shape of sandstone and quartz, and particularly near the banks of the river. The slope of the ground to the banks was very distinct when we were several miles distant from it. On its banks the limestone was abruptly broken off and the general appearance suggested the idea that some convulsion arising either from a subsidence of the strata or from an earthquake had formed the bed of the river. The banks were covered with alluvial soil and presented considerable quantities of the alluvial iron sand. A bráhmin told me that the extent of the limestone both above and below the river, was about 15 miles in each direction. Its extent in the other direction is about 40 miles.

Motapilly, 9th August, 1819.—I yesterday had some of the quick lime brought to me: it appeared to be good. A considerable quantity of calc spar is found in veins, and loose masses on the banks of the river and would form excellent lime. I rode to a pagoda about a mile from the camp and crossed a nullah beyond it, but observed nothing which induced me to continue my journey. In the evening I went on foot to the northward of the camp and found very large collections of the rounded sandstone, intermixed with jasper, crystallized quartz and containing in it carbonate of lime and calcedony with a white decomposed surface. In one or two places I observed the cement still adhering to the rounded lumps forming the pudding-stone. On all sides were numerous deep fissures in the limestone rock, through which the torrents flowed, smoothing the rough edges of the limestone. I should have before mentioned that the strata appeared generally to dip a little to the E. N. E., this dip however, is in some places scarcely perceptible.

Piedderee, 11th August, 1819.—On the road I observed bits of the clay slate, but the rock itself no where visible. I observed a vein of trap running about three miles in a N. E. and S. W. direction, considerably elevated above the granite; which contained many pieces of the micaceous granite before described, in the flat masses near the village.

13th August, 1819.—I observed nothing but the limestone. It appeared to have undergone some convulsion, the strata lying at various

angles of inclination and generally at about 25°. The greater part of my road lay through alluvial soil, the limestone appearing only at intervals; near the river nothing else was visible. I observed in many places that the calcareous cement or pudding-stone laid in the horizontal interstices of the limestone, and in no instance did I find it covering any extent of surface.

14*th August*, 1819.—The limestone as usual for about three miles, when it appeared to pass into clay slate, and at last became covered by a quartzose rock, which without any appearance of stratification formed a range of 150 feet in height, branching off in different directions; its general one being nearly the same with that on the other side of the river (E. and W.) and probably of the same composition (Poolychentah). To arrive at Moogtial I was forced to make a considerable detour, the road lying through land which had been covered a few days before by the overflow of the Kistna. Moogtial is a small town in the English territory with a fort occupied by the Zemindar. I pitched my tent close to the river and near a quarry of the limestone, in which I observed many large blocks some twenty feet in length, lying close to the water edge as if ready for water carriage; the blocks were cut out of the solid rock to the requisite thickness, and wedges inserted in the interstices of the stratification and the block was complete.

Anantagherry, 15*th August*, 1819.—I observed the calcareous compound again in the interstices of the limestone and am forced to conclude that it is of contemporaneous formation. This rock is still visible for three miles, when the ground appeared covered with pisiform iron ore and alluvium. At the village of Boodoor and on the banks and bed of the Paleer, a clay slate formed of layers of *blue, grey and red*, horizontal, and covered by the quartzose rock before described; this was soon succeeded by the granite and its usual accompaniments trap veins. One remarkably large and distinct one appeared continuous with that of Lingageree before mentioned.

Anantagherry, 16*th August*, 1819.—I this morning breakfasted with Everest who gave me specimens of clay slate from Polychinlah; of brown iron stone from Sarangapilly; and of a mixture of chlorite slate with limestone and quartz from between the two stations. The upper part of the Polychinlah ridge, is of quartz rock crystallized in rhomboidal pieces and rapidly decomposing.

Anantagherry, 17th August, 1819.—On the south side of the hill of Anantagherry, a very thin vein or dyke of basalt is seen running in an east or west direction through the concentric granite. At the bottom of the hill it is first seen about a foot broad and continues about 100 feet upwards, gradually decreasing in breadth until only a line in thickness, when it disappears. It runs in a zigzag manner and does not project above the surface. In it are enclosed small pieces of granite, which is of the same nature as that of the hill. The granite contains compact felspar of a green hue, and the basalt glittering crystals of basaltic hornblende. This basalt is easily fusible before the blow-pipe.

Hydershabeepett, 20th August, 1819.—In the bed and on the banks of a river running near this place, the mixture of the granite and trap is very remarkable. In some places it is enclosed in it in the same mode as the micaceous granite of Solokoondah, in others running in thin veins, and lastly mixed in streaks, as if it had been melted with it and flowed down.

Hydershabeepett, 23rd August, 1819.—On the top of the hill I saw in many places the rounded masses of micaceous granite enclosed in the rock, which itself contained large scales of mica and garnets and was in beds, generally very large grained and decomposing very fast; the top is above 500 feet above the plain.

Hydershabeepett, Saturday, 28th August, 1819.—The bed of the river which flows near this village, presents a very remarkable mixture of the granite and trap in veins, and in rounded masses. The former appear to be of later formation, since a vein passes through one of these rounded lumps. The same vein is also heaved out of its course several inches by some convulsion. I was able easily to fuse a small piece of it before the blow-pipe. It more nearly resembles the basalt vein of Anantagherry, than the common greenstone vein which is also not so easily fusible.

Monday, 30th August, 1819.—I observed on the summit that same mixture of the granite as before mentioned. At this village I observed a small rock with concentric layers and the mixed granite.

Sunday, 12th September, 1819.—The hill of Babecondah is a mass of concentric granite about 500 feet above the plain and occupies the centre of a range of broken hills of the same nature, running about 5° to the west of north and extending three or four miles. The principal

rock is granite of a grey colour with a considerable quantity of quartz and very little mica. It encloses masses of micaceous granite as usual, some of which are bent into various forms, differing probably from the original, and when they were in a semifluid state. I saw also on different parts of the summit and sides red granite with large crystals of felspar, also enclosing the lumps of micaceous granite. The hills to the eastward of this station present one continued waving outline of forty or fifty miles in extent, gradually diminishing in height to the N. where they become flat and present openings in their course, not very dissimilar from those in the environs of Beder. At their highest part they present two or three small peaks, but their general outline is waving without the ruggedness of the granite.

Yesterday I went to see a quarry of calc tuff about three miles to the N. W. of Ingourtee. It differs very little from that so commonly spread in this country.

Wednesday, 15th September, 1819.—We passed through a defile in a range of mountains running nearly North and South composed of granite, with quartz rock strongly impregnated with iron lying over it. On the descent from the opposite side I observed clay slate, but not in distinct strata, until I had advanced about one mile and near to a river, when it appeared at intervals running horizontally or with a slight inclination.

In the bed of the neighbouring river, I observed bits of granite, limestone, clay slate, quartz rock and agate; its banks being about 15 feet in height and alluvial soil.

Thursday, 16th September, 1819.—Our camp was this day pitched in the neighbourhood of a nullah which was at the foot of a range of small hills, and on the banks I perceived clay slate in large masses without regular stratification and lying on alluvial soil. The bed of the nullah consisted of quartzos esand. We passed through on our way to Commerarun, winding through the vallies formed by the broken ranges of mountains, a fine alluvial tract, the substratum being only visible at intervals, which at all times and without any perceptible difference of level was clay slate, sandstone and quartz rock. Near to Commerarun in passing through a defile composed of an alluvial red clay, I observed on the surface, numerous agglutinations of ironstone very much resembling the iron clay, the ground being at the same

time strewed with black magnetic ironstone similar to that of the red hills near Madras, and broken pieces of quartz rock. The village of Commerarun is finely situated in a circular plain bounded on all sides by waving hills of clay slate, rising from 200 to 600 or 800 feet above this.

Friday, 17th September, 1819.—I ascended an elevation, at the foot of which our camp was pitched; I found it to consist of indurated clay slate in vertical strata. Its natural fracture from decomposition was in an oblong thin lamellar piece, with sharp edges; some which I observed at the top was rather porous.

Saturday, 19th September, 1819.—I started at 4 o'clock, and halted at a village called Mocarra. From Commerarun the rock was principally clay slate, with quartz rock lying on its surface in broken pieces; the vallies between the hills were very narrow, and the sides of the hills precipitous, with fine cascades of water rushing over the disrupted strata, which generally dipped to the S. E. at various angles. One mountain near my halting place had a tabular form with something like sandstone or quartz rock on the top. In the beds of the nullahs near this I generally observed angular and rounded masses of this rock.

Anchitipilly, Sunday, 20th September, 1819.—A short time after day-light, having started at 3 o'clock, I observed sandstone in very large masses, little elevated above the surface. The greater part of the road lay through alluvial soil covered with forest trees and a thick jungle. At 2 o'clock I arrived at Paloounchali which has a large square fort built of sandstone with bastions at each angle. The Godavery is 15 miles distant, due East.

The country from the clay slate to the Godavery, is sandstone cemented by alumine. It appears in some places to be in a state of rapid decomposition. The range at Paloounchali 1,000 yards from the fort is 600 feet in height? Mr. Burr says 1,200, which I doubt; 5 miles in length and a mile in breadth is composed of the sandstone and it runs due E. and W. Hot spring of Bougah: Mr. Burr says, it is sulphureous; hills in the neighbourhood very lofty, the Mooee Enoo river of Paloounchali runs into the Godavery.

The temple of Buddrachellum a remarkable object; Boorgamallapadu, in its neighbourhood, is said to contain diamonds,—a hill called the needle hill of Pachapilly, are remarkable peaks on the other side of

the Godavery and part of the Vindhiya range which runs N. W. and S. E.

Monday, 24th September, 1819.—The holes so frequently interrupting my night march appeared to communicate with gullies under the surface of the alluvial soil and running on the sandstone beneath.

Tuesday, 25th September, 1819.—The tabular mountain of which I have spoken on the 19th is near the place where the clay slate first makes its appearance in coming from the eastward, in stratified masses little elevated above the surface, a S. E. dip and an angle of about 40°. The change in the soil was very perceptible, the traces of travellers dried by the sun showing adhesiveness and clayey composition. The hill above alluded to had its upper half, at least, composed of sandstone. The access was too difficult and my time too short; at a distance the precipitous hills and rocky narrow vallies commence.

The clay slate is generally very much indurated, contains large and small veins of quartz; I observed also quartz rock or sandstone about its centre. The explanation that first presented itself of the phenomena which were here seen on so grand a scale was, that all the clay slate had been originally covered with sandstone, and that a general and partial subsidence of strata had taken place, producing on the one hand the dip to the S. E. and on the other the central isolated masses with precipitous sides and covered by the sandstone which had remained in its original state.

Tuesday, 28th September, 1819.—I ascended the hill of Punchbundoll twice during my stay at Commerarun. The road to it lay through a plain of six miles intersected by nullahs, containing most generally angular pieces of sandstone and clay slate and very little alluvial mud. The ascent to the hills was about 4 miles in length and lay over quartz rock or sandstone and slate. In the ravines quartz or sandstone alone was to be seen lying in the strata, but horizontal. The principal ravine I passed had apparently been formed by a slip of the strata, one side being perpendicular and the other a gentle slope.

Komarum, 30th September, 1819.—During this day's journey I no where observed the iron clay; the greater part of the road lay over alluvial clay. At times indurated sandstone or quartz and clay slate of the kind described at Allatoor, small pieces very much decomposed and passing into clay.

Bondoll, 1st October, 1819.—The road lay as usual over alluvial soil and clay slate. In the beds of the nullahs both the latter and sandstone were observed during the last six miles. We passed over a hill consisting solely of sandstone which we saw in very large blocks and rapidly decomposing.

I examined the sand of a nullah and found it to consist solely of quartz grains, although the stream was very turbid, which I suppose to arise from the aluminous cement of the sandstone.

Yellapooram, 2nd October, 1819.—We began to cross the N. and S. range of mountains consisting of quartz rock or sandstone and clay slate. The first ghaut we passed consisted of large masses of sandstone decomposing very rapidly. This was intermixed with red and brown ochreous ironstone. At the distance of four miles after passing a small nullah, on our left appeared an abrupt lofty elevation of sandstone; the masses presented on their surface and sides indurated veins of a substance composed of grains of quartz and brown ironstone of much greater hardness than the sandstone and therefore projecting from less facility of decomposition. Not far distant from this and in a position which warranted the idea that they had fallen from the precipice lay large masses of puddingstone, composed of white and brown pebbles of quartz with a sandstone matrix. I saw from beneath that the upper part of the rock was composed of this, whilst that underneath it appeared to have few or none in it. This continued for a mile or more, when the iron clay was observed in large distinct masses and mixed with the sandstone, both in veins, lying as it were in the interstices of different blocks, and mixed with it, forming a conglomerate rock. This occupied a very small space and was succeeded by the sandstone, the beds of all the rivers were composed of quartz sand.

Warungull, 12th October, 1819.—I observed a considerable number of pieces of jasper lying loose and that the neighbouring elevations were of sandstone. It was dark when I began to ascend the hill; but having ascended it every day we remained at Yellapooram, my observations are all given together in this place. The sandstone is rarely seen in the plain, being covered with an alluvium, the paths and beds of rivers are all sandy. On commencing the ascent the sandstone presents itself in large unstratified masses, with its surface coloured from decomposition, being nearly black exteriorly and interiorly of a

yellowish grey. I observed in various parts, the indurated feruginous waving veins or partitions before observed, p. 289. Also loose pieces of jasper iron ore, and quartz with a large proportion of iron. The top of the hill was composed of sandstone in which pieces of lithomarge were prevalent, and the rock itself appeared to be cemented by that mineral.

Mr. Ralph told me that the rocks all the way from Paloonchah to Mungpett were of sandstone, and that greenstone was found in the bed of the river. He gave me a piece of brown iron ore, jaspery iron ore, and an agate found on the road. He was travelling towards Sinsillah, a place noted for its iron mines and manufacture of steel: of which Conah Rao showed me a specimen in a very handsome dagger.

November 7th, 1819.—The whole of yesterday's journey was through trap and granite. The former of the usual appearance; the latter very indistinctly seen above the surface until we arrived at the bed of a bamboo river,* where it was seen in considerable blocks. Here I was told that plates of mica were procured. I accordingly observed that some of the granite was very micaceous and very white; we arrived at dusk near the river.

December 19th, 1819.—Left Secunderabad on the 18th. On crossing the Mussy I observed nearly the same appearances which I have before noticed on a former journey: I arrived at Ombrepett in the evening. This day I observed abundance of the red granite, and the vein of trap which I have before mentioned entirely disappeared. In the evening I rode to our former place of encampment with Ralph; I observed large masses of granite lying on the surface of the main rock the result of the decomposition of the last rains.

December 20th, 1819.—I gathered on my way to this place, Gorampullee, some red granite with hornblende, and some specimens with limestone intermixed with it; I began also to see the calc tuff at Uddajuth. The descent this day was considerable, although the distance travelled was not more than 12 miles.

December 21st, 1819.—In crossing this day our old station of Uddajuth and the Thieves' hill, granite as usual and veins of trap.

December 22nd, 1819.—Great quantity of granite with pieces of the micaceous granite enclosed, also pieces of the greenstone in veins and lumps. Nakurkull.

* So in MSS.

December 23rd, 1819.—Granite as usual, and camp at Sooriapet, beyond the Mussy, the bed of which is here very broad; I observed no rocks.

Mungal, 24th December, 1819. Granite as usual.

Shermahommedpet, 25th December, 1819.—I gathered some granite on the road to this place, here I first saw the black soil.

Nundigaon, 26th December, 1819.—On my road from the last village to Nundigaon, I ascended a hill, at the foot of which the road ran. It was composed of granite, which here and there contained lumps of the micaceous granite. Its upper third was composed of granular quartz rock, or it may be called a highly crystallized sandstone. I also observed near Nundigaon a vein of basalt passing through the granite, which was of the usual kind, but contained more hornblende than usual.

Chinchirlak, 27th December, 1819.—A coss distant from Purteal, we quitted Chinchirlak at day-light to go to the diamond mines at Purteal, which lies nearly south of the former, about a coss. We passed through the black soil covered with fine crops of jouwarrie; about three miles to our left was a range of mountains which bounded the plain to the eastward running due north and south. On the other side were the indistinct ranges of Polychinta on the banks of the Kistnah and before us those of Condapilly. On our approach to Purteal we began to perceive many rolled pieces of quartz, greenstone, jasper, sandstone and granite; evidently not the debris of the neighbouring mountains. The mining process had been sometime abandoned, and the workmen were employed at the site of the old excavations in resifting the old rubbish; the produce of their labour scarcely repaid them with the means of subsistence. The old excavations were very numerous, and about 20 yards square, and filled all over with water and rolled stones, I found a breccia limestone containing quartz, garnets and jasper. They were of an irregular form and did not appear to have been subjected to the action of running water; I enquired if diamonds were ever found in them, and was answered in the negative. The process of searching for diamonds performed before me was as follows. The large stones were first thrown on one side and the remainder of the heap carried into a raised platform of mud where from a sieve, the large ones were dropt on the ground by means of a lateral motion of the hand and the dust remaining deposited in another mass which was spread abroad, wetted

and gone carefully over by another person. In the course of his search he laid by the agates, cornelians, jaspers, sapphires, garnets, &c. which are said to abound. I purchased the whole stock of diamonds of the village, amounting to 3 oz., for 4 rupees, and some cat's-eye, garnet, sapphire, jasper and calcedony for 2 rupees. The village was in ruins and the people did not appear so well fed or clothed as those of the village we came from. On returning to the tents I visited a rock nearly in the centre of the plain, consisting of three peaks, which suggested the idea of the pinnacle of some deep-seated granite mountain. The granite was very red and containing hornblende in crystals. After breakfast, I went due east from the camp, three miles, to visit the range of rocks I have before mentioned. I found them to consist of granite, composed of felspar, hornblende, quartz and some mica, which however was not always to be distinguished. Two things are well worthy of consideration respecting the situation of the diamond mines: they are surrounded on all sides by the alluvial black soil, which has originated in the inundations of the Kistnah. They are not elevated above this soil, and I should imagine were once covered by it, although they at present appear elevated from the quantity of earth thrown out from the different excavations, of which I counted at least twelve.

2. The neighbouring rock is of that kind to which it is difficult to assign a name, although its constituents are very distinctly marked, namely, felspar and hornblende, yet from the equal mixture of those two minerals I should prefer the name of syenitic greenstone. It is worthy of remark that the mountains six miles distant are of vertical gneiss.

Ibrahimpett, December 29th, 1819.—We arrived at this place crossing the end of a range of irregular hills which appeared to run nearly due N. and South. I conceive that Dr. McCulloch would call the rock syenitic greenstone; or perhaps would call it merely a modification of the granite of which the whole of the basis of the country is formed. Unlike, however to the out line of the hills of granite to the N. E. North and N. W. they exhibited no loggan-stones and no bare summits but were covered to their tops. After breakfast we went to Condapilly and there saw Mr. Spry who inhabits the old fort, at the foot of the range which in Heyne's Map commences at that place running due N.

E. and which he has named gneiss. Ibrahimpett is on the left bank of the Kistnah, which is about twenty feet in height, composed of the black soil; the bed is however very sandy and very broad, perhaps two miles.

Bezwara, December 30th, 1819.—Our road lay in the bank of the Kistnah, which river suddenly contracts to run through the pass of Bezwara formed by two hills of gneiss that appear to have been separated by force; according to Dr. Heyne the range is continued to the N. E. I ascended and found his description correct, except that I did not observe the ochre which he spoke of as mixed with the other ingredients composing the rock. In some places the stratification was not all distinct but appeared massive like common granite. Veins of felspar traversed the rock, and in many places I observed black spots on the rock, arising as I suppose from oxydation of the Iron.

December 31st 1819.—I crossed the river early to visit the caves near the village of Ungley. They consist of three excavations one over the other; the roof is supported by pillars of the usual form in Hindoo temples. Around the walls were different relievos very much mouldered. The upper story contained a colossal figure of 25 feet in length, lying on stones in a recumbent posture; around him on the wall in relief, figures of deities; and two colossal figures which appeared to protect his slumbers. The whole was excavated out of the gneiss rock, which is very fast decomposing, the decomposition taking place principally in the centre of the pillars. The lower excavation leads, it is said, to Mungulghery about three coss distant. In returning down the causeway cut in the face of the rock I observed what appeared to be limestone mixed with the granite, also something bearing the appearance of manganese. The rock consisted of quartz, felspar, mica and jasper in great abundance; the stratification in the Bezwara hill was very evident from this side, the dip of the strata was to the eastward and the angle about 70 or 80°. The range suddenly takes a turn to the N. E. to the northward of Bezwara forming a portion of segment of a circle. I a second time ascended and reached the summit of this hill. The prospect was commanding and embraced a field of 30 miles each way; perhaps much more, as I was told, Onnda was visible on a clear day, distant 40 miles. The range of Chintapilly or Pooly Mintan was very distinct as well as the Guntoor districts near Ardingby. It may be remarked here that the

decomposition of the gneiss although rapid does not supply a rich soil. The figures in the pyramid appeared to have had their damage sustained from this cause repaired with plaster, which was fresh enough to lead one to the supposition of its being modern.

January 1st, 1820.—I went to Munglegherry at eleven o'clock; two miles of our road lay over the black soil, and was succeeded by that arising from the decomposed gneiss in the passes through which our road lay. The difference of level was very perceptible, the latter being the highest ground, and if the alluvial black soil has been deposited as I suppose by the floods of the Kistnah, the phenomenon admits of an easy solution. Munglegherry stands at the southern termination of the remarkable range of gneiss rocks, which is continued with several interruptions to the bed of the Kistnah and re-appears on the opposite bank at Bezwara, the passage of the Kistnah between the precipitous sides of each mountain forming the celebrated pass of that name.

The tower in front of the pagoda of Munglegherry is about 100 feet in height, it is composed of 12 stories of the usual form. It is built of a red sandstone containing large and small grains of quartz. The variation of the compass, supposing the pyramid to be N. and South, is about half a point. The stone had been recently brought from a considerable distance according to the Brahmin. The sculpture and relievos were much inferior to the specimens of those from Amrawutty.

Masulptaur, January 4th, 1820.—Yesterday morning at 11, I arrived, after passing for the greater part of the journey over black cotton soil, which was succeeded by sand about 3 coss from Masulipatam. Immediately also commenced the groves of Borassus flabelliformis, and Euphorbia Tirucalli, both of which grew very sparingly on the former soil. I was particularly struck on arriving at the sandy soil with the mirage or appearance of water, with trees, and houses reflected on it. On passing through the Bazar I observed many stones resembling those of Amrawutty, and which, as I was informed by Mr. White, had been brought from thence.

The sand in some parts was covered with the magnetic iron ore, mentioned by Dr. Heyne in his tract on the Circars.

February 5th, 1820.—Analysis of limestone from the Kistnah:

Carbonate of lime	84
Silica Alumine Iron	16
	100

February 9th, 1820.—Left Guntoor at five o'clock for Bellumcoondah at dusk, and at the distance of three coss N. W. of Guntoor, I crossed a low range of syenitic greenstone; the specimen I have preserved presents on one surface a very considerable quantity of hornblende in crystals mixed with a small quantity of felspar, and on the surface some spots much resembling mica. I have now so frequently met with a mineral resembling equally hornblende and mica that I am constrained to think with Mr. Brande that they mutually pass into each other. The range from which I procured my specimen had partly the concentric structure, which distinguishes the granite to the N. and partly a concrete structure; that being generally at the uppermost part of the rock. At day light on the—

10*th February*, 1820.—I arrived at Bellumcondah and prepared immediately to ascend the hill. I took the height of my barometer within 30 feet of the top. The remains of the fort and of the building are of Hindoo architecture; some of Moghul. The rock is principally composed of a granite containing quartz, felspar and small spots of the substance intermediate between mica and hornblende. In general outline it resembles much those rocks to the northward, such as Coilkondah, &c. having nearly the same direction, and like them veins and distinct masses of greenstone running through it. I observed at the summit of the hill a very large piece of greenstone, which seemed to have survived the decomposition of the rock in which it was once enclosed, from its greater toughness. The appearances however of the granite were not always the same; sometimes the felspar became red, and the whole contained a greater quantity of mica; quartz impregnated with chlorite was sometimes found in veins and detached masses.

Upon the whole I have no doubt that the granite is of contemporaneous formation with that to the N.

At ½ past 2 o'clock I left Bellumcondah travelling at the foot of the granite range for about 4 miles. The plain I then entered frequently presented isolated masses of granite, decomposing rapidly, and giving rise to a red siliceous soil which did not appear very productive. On my left to the N. W. I saw the range of Chintapilly characterized by its being crowned with quartz rock or crystalline sandstone. The lower formation seemed continuous with the granite of Bellumcondah.

Amrawutty, February 11th, 1820.—I arrived at this place at sunrise and immediately mounted my horse and visited Depuldinny. I found a circular excavation about 300 feet in diameter, its angles facing the intermediates to the cardinal points; all the stones dug up had been removed to a bungalow hard by, belonging to the Rájáh. I noticed two capitals of columns partly visible, the earth not having been cleared away from them, I bathed in the river, jumping from a mass of granite rock which projected into the Kistnah; there were many quartz veins running through it, it resembling very strongly No. 7. On my return I made a detailed examination of the stones in the bungalow, No. 25. I then re-visited Depuldinny. I had leisure to notice that the area occupied by the stones, was circular and 100 yards in diameter. It is probable that the extent in somewhat greater, since I observed some of the circular capitals bisecting the circle in a direction E. and W. The area contains a well dug by the Zemindar Jugganauth Row, about 15 yards square, the depth about twenty feet, the upper half the calcareous breccia or pisolite, the lower micaceous schists in vertical strata injected with veins of the calc breccia, both vertical and horizontal, communicating with each other. I afterwards paid a visit to the pagoda: nothing remarkable but the inhospitality of the Brahmins. I crossed the bed of the Kistnah to Autcom, the bed is three miles wide and contains a very large island, on which I observed the thistle; a few esculent grains growing on the black mud of which the upper part is formed. The old man Apparoo, whom I had previously seen at Purteal made his appearance. He told me that the greatest depth of the diamond mines was 18 or 20 feet, and they then came to an earth called Nushar, which was soft, and that the real reason that fresh ground was not opened was from the want of capital to begin; the price of labour was a seer and a quarter of jooarrie each man per diem. No diamonds had been found in any of the villages for a considerable period. At five o'clock I went to the diamond mines with the Kurnum, sending my bearers on towards Condapilly. I saw nothing but heaps of old stones and earth by the side of the excavations. The calc tuff and the pebbles of jasper and quartz were the most conspicuous in the excavations; but I was told that there was a considerable quantity of fresh ground to the north. I arrived at Condapilly at nine o'clock.

Condapilly, February 12th, 1820.—I ascended the hill of Condapilly at sunrise but was unable to proceed farther than the palace and fort

from fatigue. The hill appeared to be composed of one rock, syenitic greenstone; the appearance of a crater was particularly remarkable in the centre of the hill. I descended and found that Captain Grey had arrived during my absence. I quitted it in the evening for Mylaram and arrived at Ankerpilly on the 13th February 1820.

After remaining a greater part of the day I ascended the hill, the east side of which is occupied by 4 pagodas in succession. I found the rock to be granitic, but twisted to a great variety of forms, sometimes resembling the mica slate at Aberdeen, sometimes that of lava. I was much surprized at the obscene figures on the car of Juggernauth carved in wood. I left in the evening and arrived at Malavilly at night.

At sunrise on the 14th February, went to the mines which are in obliquely elevated land about a mile from the village. I was attended by one of the miners who had formerly worked there. The excavations were deeper and longer than those of Purteal. The depth to the diamond bed consisted of three layers of earth occupying a space of about twenty feet. The rocks in the neighbourhood appeared to be of granite, or at least resembling it. I had not seen any thing of the black soil from my leaving Mylavarum. There is a considerable quantity of ground which has not been examined, the whole ground occupies a space of a coss surrounding the whole village. I was informed that the cause of the working of the mines having ceased was want of capital, and the disinclination of the landholders to their extension.

There is a formation there common to all the diamond mines that I have seen, namely, the calcareous tuffa; the more I see of this the more I am convinced of its affinity to the iron clay formation, and that it will be found passing into it. A short time after leaving Ankerpilly the palm trees made their appearance indicating our approach to a siliceous soil. Two or three coss from Ellore I entered on a spacious plain resembling the dry swamps of Masulipatam and its neighbourhood. The soil was for the most part red, containing silex and alumine, but in the immediate neighbourhood of Ellore the cultivation had impregnated it with more vegetable and animal matter. At Ellore I met a surveyor of Colonel Mackenzie's (Mr. Donegan) who showed us some of his maps. I observed that throughout the Guntoor district the level gradually descends from the banks of the Kistnah, this I ascertained from the bund of the tank being most generally toward the sea. The

scale of this map was one mile to an inch. He also observed that the sandy soil and its stripes of palm and cultivation, extended about 6 miles inland all along the coast, and he expressed his opinion that it owed its origin to the winds that blew it from the sea shore, and not from the desertion of the sea.

I left Ellore on the 19th February, at six in the morning for Rama Singhwaram 13½ miles: for the first two or three miles open country and thin cultivation on the soil common to the neighbourhood of Ellore. It was succeeded by red soil and pisiform iron ore, similar to that covering the iron clay, at times large pieces of a conglomerate resembling the iron clay of Midnapore, and red iron ore.

February 20th, 1820.—After travelling from four in the morning I arrived at this village nine miles distant. On my arrival at sunrise I ascended the hill, my barometer not being with me I could not take it up. I found the rock to be sandstone, the cement lithomarge, which was also found in it in large and small amorphous masses, together with jaspery and red iron ore; rounded pebbles of quartz were intermixed, and it strongly resembled the rock of Yellapooram and the country around, containing in it those linear shells* of a black ferruginous substance and presenting in no instance appearances of stratification. One part of the rock which I visited and which had been hollowed out artificially was studded with bits of lithomarge white and pink, and had the projections which I mentioned as having been observed on my march to Jellapoorun last year, the dome was an excavation in the rock forming a small chapel with a cupola from which ribs descended to the girdle; the lingum was of a solid piece of rock but decomposing very fast. I observed in my evening's walk two large trees growing near the tank, of the Strychnos potatorum.

Monday, February 21st, 1820.—I left the village of Narsapoor an hour before sunrise, our road lay between the vallies of the sandstone formation, and was rendered difficult by the loose sand into which it had decomposed. The elevations were slight and the ranges much broken, their connexions with the vallies generally by an easy slope.

The horizon around us is entirely concealed by hills, the general direction of which is N. E. and S. W. their outline rather flattened and rounded with a few conical elevations. We saw the hill forming

* So in MSS.

one side of the pass through which the Godavery flows, distant about 40 miles. The soil appears very productive but does not contain any carbonate of lime. The hills are covered to their summits with trees and jungle.

Tuesday, February 22d, 1820.—After a very fatiguing march through the jungle, in consequence of losing my way, I arrived at Ashwarroopoora. We passed the frontier a short distance before our arrival (1 coss). There I saw numerous pieces of red iron ore, rounded and amorphous, the soil and other appearances generally resembling that of the iron clay. I paid a visit to the Rajah of Paloonshah, who is the owner of the village. I saw a well about 35 feet deep ; the lower 20 feet consisted of a mixture of clay and sand of a whitish and yellow colour, easily friable, and not effervescing with acids, on the one side, and on the other a loose mixture of clay and rounded pebbles of iron stone ; in short the iron clay in the most imperfect and unconnected state. The white clay and sand appeared to contain in it some extraneous bodies, but their forms were too undetermined to enable me to guess at their nature.

Wednesday, February 23d, 1820.—I rose early to go to the ruins of an ancient village called Polarum, and in my way crossed a nullah which was reported to come from the hills and to run the whole year. The soil appeared generally to be highly capable but covered with jungle. The village we went to visit was a proof of the former extent of cultivation ; even its ruins are covered with jungle.

Thursday, February 24th, 1820.—In the evening I went to the neighbouring hill, a low range running nearly north and south, and to my surprize found the hill composed of syenitic granite in which the felspar was smallest in proportion, and the hornblende sparingly distributed.

On the surface of several masses I observed hornblende in crystals, the thickness of the jungle prevented me from seeing to any distance round. At the bottom of the hill I observed pieces of the conglomerate sandstone in abundance but saw no rock visible.

Merripullee, Friday, February 25th, 1820.—The road was strewed with debris of the syenitic rocks. In one place I observed rounded pebbles resembling those found in the conglomerate ; also pisiform iron ore. About 2 coss from the last village I crossed a small nullah in the bed of which was granite and the sand granite.

In a second nullah close to the village the banks were of alluvial clay, they contained very large masses which presented, in one or two instances only, a stratified appearance with a south-east dip, of an angle of 70 degrees. The granite contained felspar, mica in crystals, hornblende and quartz. I also found in it veins, with all those ingredients, but in much larger masses, the veins were parallel to the stratification. In a vein composed principally of whitish felspar, I found crystals of corundum and tourmaline, the latter of a pale green.

The vein was parallel to the dip of the strata; on passing farther on, below the river, the same kind of granite in large masses and without any appearance of stratification occupied the beds and banks. It sometimes contained masses of red and white crystalized felspar the latter containing small specks of mica. I saw at the distance of about 20 miles the peak of Rachapilly. The general direction of the mountains is very difficult to be made out, but that of N. E. and S. W. the nearest. The sand of the river was granitic, being composed of the debris of the granite and small garnets.

Thatkoor, Saturday, February 26th, 1820.—This place is about 13 miles N. W. of the place where Mr. Burr was taken ill last year, and where he terminated his survey of the Godavery; on our road hither from Merripullee we crossed the river twice, and found in its bed the same kind of granite and granitic sand. We saw two cultivated spots of land in the forest on our way to this place.

After dinner I went to the Godavery about a mile and a half to the eastward, the bed consisted of granitic sand mixed with calcedony carnelion, agates, jasper, and flinty slate: the banks were about 40 feet in height and compesed of the black alluvium, and the bed a mile wide; on the opposite side of these were lofty hills and one particularly remarkable for its peaked summits. The village of Rachapilly is very near it.

Sunday, February 27th, 1820.—We rode in the evening to the bank of the Godavery. Having descended it I went about ½ a mile on the sand, until we came to a bed of rocks in the river. We found them to be the slaty granite or gneiss. On our return we picked up the same stones which we observed yesterday.

Monday, February 28th, 1820.—We arrived after rather a fatiguing march at Coveeda, which is on the bank of the river. In the evening

I descended the lofty bank which cannot be less than 45 or 50 feet in height, whilst the breadth from bank to bank must have been ½ a mile, we measured three hundred yards of dry sand, and the remainder was about 800. There were a number of people called Reddies, sitting on the opposite bank, watching our motions: I began to light watch fires very early.

Tuesday February 29th, 1820.—We arrived at Kaukusnorr leaving our large tents behind us, the road being impassable for bullocks, horses and elephants. From the steepness of the rocky bank we were obliged to make a considerable circuit amongst the hills; we crossed several times during the morning a river which we were assured was never dried up during the hottest season. In two places, I observed on its bank masses of a rock resembling the iron clay of Midnapore, which contained pieces of black iron ore resembling the slag of a blacksmith's forge. Our road lay through the hills and in a very circular route. In the afternoon we travelled along the river side to Perunapullee a small village with four small houses. Near it a rapid torrent rushed from the summit of Papeoondah into the river. We returned by torch light.

This was the limit of our journey by land.

Wednesday, March 1st, 1820.—We left the village of Kaukusnorr in one of the rude canoes belonging to the cultivators, who are here called Reddies, dwelling on both sides of the water. I had first ascertained the temperature of the water at sunrise and found it 10 degrees higher than that of the atmosphere, which was 64°. The temperature rose and fell repeatedly during our short voyage to Peruntaputtee. On landing I examined the temperature of the mountain stream, 68°; that of the air being then 72°; about 9 o'clock. After breakfast we again betook ourselves to the boat and proceeded in an easterly direction as far as the village of Poloor where the river takes rather a sudden turn to the southward, and is confined by the bases of the lofty hills of the Papicondah pass which we estimated at 2000 feet above the river level, we proceeded, still confined by these lofty banks, until we found ourselves distant about a mile from a village called Sri Raca and a mile and half from Caroor both Company's villages and on the right bank of the river. At this place we found two masted boats proceeding with sails at about the rate of two miles an hour up the river for wood, empty; they belonged to Rajamundry, distant about 15 coss. Polavarum about 7 coss.

We set out on our return about 3 o'clock and soon found ourselves relieved from the intense heat of the sun's rays by the shadow of the lofty mountains. As we returned we had leisure to remark in various parts of the river small accumulations of sand and various nooks and jutting points, but no black alluvium, which renders it probable that the mass of this soil is deposited at and before the entrance of the pass which is at Coloor: we gave the name of Rámа's peak to the highest on the right bank, and that of Sitá to the highest on the left, and to the other (one-tree hill) Latchman's peak. I was well pleased at the opportunity I had of passing through this lofty ravine. I had entertained doubts previously of the propriety of calling the formation gneiss, the slaty structure being so rare and that of the concrete massive being much more common. Here I had an excellent opportunity of observing that they resembled generally the granite hills of Scotland in their peaked summits, and in their angles corresponding generally with that of the fracture of the smaller masses: the general structure of the granite was felspar of a very pearly lustre and easily dividing into rhomboidal pieces; quartz, and garnets.

On the General Vibration, or Descent and Upheaval, which seems, at a recent Geological period, to have occurred all over the Northern Hemisphere.—By GEORGE BUIST, L.L. D.

The whole of the Desert betwixt Cairo and Suez bears the clearest evidence of having, at no distant period, been under the bottom of the Sea.

After a fall of rain an efflorescence of salt still appears on its surface. The gravel consists of rolled pebbles, mostly portions of the adjoining rocks. It is every where mixed with sea shells. The Desert at the Centre Station reaches an elevation of 800 feet, and shells are said to be found at the elevation of 2000, both on the African and Arabian side.* This most probably has been elevated at a remote period in comparison with the date of the upheavals along the shores of the Red and other Seas about to be noticed.

* Dr. Wilson's Lands of the Bible—Dr. Hoffmeister's Travels.

All around Suez there is a vast expanse of level plain extending from two to twenty miles inland, diversified, here and there, with hillocks of drifted sand, obviously the effect of the wind. A section of the material of which the plain is composed is exhibited along the sea shore. It is about eight feet above high water mark, and consists entirely of sand, gravel, and shells perfectly fresh, and apparently of the same varieties as those on the beach. This upheaval extends, with little or no interruption, all the way to Aden, unless where the cliffs advance boldly on the Sea. A similar beach, at a similar elevation, is found all around the peninsula of Aden; and though I have had no means of personally determining the fact, I have no doubt it will be found all along the Arabian coast, around the Persian Gulf, and so on to Scinde, and by the shores of Goozerat and Cutch. Of the Delta of the Indus I shall have occasion to speak by and bye, and so at present pass over Kurrachee. At Gogo, in the Gulf of Cambay, the raised beach is peculiarly conspicuous: the gravels and shells are here cemented into a variety of stone on which I have bestowed the term "Littoral Concrete," from its being always found near the shore, and from its resemblance to the artificial building material called concrete. At Gogo it overlays a huge mass of blue clay. With the interruption occasioned by the Delta of the Taptee, the raised beach, mostly consisting of the material just named, extends all along the shore to Bombay, and so on to the southward; and though I cannot speak from experience of the coast further south than 19°, I have great reason to believe it to be continuous, and feel almost certain that the specimens sent to me from Cochin, by General Cullen, belong to it. The upheaval in all these cases varies from six to nine or fifteen feet above high-water mark, rarely attaining the higher elevation. The same thing prevails around a large portion of the shores of Ceylon.

The Island of Mauritius is belted by an enormous coral reef throughout its whole shore, excepting about ten miles. Between Savanne and Bois-du-Cap the sea foams against a barrier of coral from five to fifteen feet in height, and wears it into the most fantastic shapes. At a considerable distance inland, and almost concealed by the trees and shrubs, are two remarkable points or headlands of coral, from twenty to twenty-five feet above the level of the sea. The Observatory of Port Louis is built upon a stratum of coral ten feet above high-water mark. Blocks

of coral, too vast for being transported by any existing agency, are found from 600 to 1300 feet inland, and which are cut off from the shore by elevated ridges.* The great part of the numberless Coral Islands which are scattered betwixt the Cape of Good Hope and Ceylon —the Chagos Archipelago, the Seychelles, Laccadives, and Maldives, appear to have been elevated to their present level by the same upheaval by which the terraces now under consideration have been produced, of which, I have no doubt, abundance of traces will be found all along the shores of our Eastern Seas. Captain Newbold mentions the abundance of this class of phenomena on the coasts of the Mediterranean, where the shell gravel, as in India, is being cemented into stone. Beaches hardening into stone prevail along the straits of Messina.† Damier speaks of a calcareous deposit in New Holland, consisting of rock, which he thinks must have been formed by the drifting up of sand and shells over a mass of wood, the whole being afterwards consolidated by rain water: this I have no doubt is an instance of the variety of formation, and a proof of the double movement under review;‡ and it seems not improbable that the shell formation of Madeira belongs to the same class of beds, though of this I cannot speak with confidence.§ The narrow Isthmus connecting the Rock of Gibraltar with the main land is obviously the result of an upheaval, probably of the same age.

Amongst the numberless points where evidences of an upheaval are to be found in Scotland, are the following:—The railway betwixt New Haven and Edinburgh cuts a large bed of shells about twenty-five feet above the level of the sea. A large bed of cockles, obviously in situ, is found at Borrowstoun Ness,‖ in the Forth, at about———feet above high-water mark. Cockles live at from 2 to 5 feet below low water. All around the shores of Fife to St. Andrew's, there are beautifully distinct exhibitions of upheaved beaches, several appearing in succes-

* Transactions of the Geological Society—Jamieson's Journal, 1841.

† Jamieson's Journal, Vol. XLIV. Page 63.

‡ Journal of Researches, by Charles Damier.

§ Macaulay.—Jamieson's Journal, 1840. The Madeira Wood is spoken of as being silicified: if so, it must belong to a much more ancient date than the class to be described.

‖ McLaren.—Jamieson's Journal for 1850.

sion.* These beaches, which have from St. Andrew's to Ferry point on Craig been covered with drift sand, re-appear along the banks of the Tay—from this westward by Newburgh and Perth. Betwixt Errol and Invergourie Bay on the opposite shore, is a bed of cockles, about three feet above high-water mark, corresponding closely in character with that of Borrowstoun Ness.†

The Arbroath Railway cuts and exposes the shell bed from near Dundee to Broughty Ferry, after which, it is concealed by the sandy Downs. It re-appears to the eastward of Arbroath, and again in Lunar Bay, and to the north and south of Montrose. Beyond this my researches along shore have not extended.

Two beaches are described by Mr. A. Stevenson, off the Ross of Mull near Skerryvore,‡ on the Frith of Clyde, and probably along much of the low part of the coast to the south.§

The reasons why raised beaches are not at all continuous along our shores, are very obvious. Where the shore was precipitous, and the water deeper at the bottom of the cliff than the whole amount of the upheaval, then, though the bottom of the sea might be raised by so much, and the water become to this extent shallower, there would be no emergence, and the aspect of the coast would then be nearly the same as before—the cliffs having become just so much loftier. Beaches, originally existing, have been swept away where the whole of the material composing them consisted of sand, shells, or gravel, or where they rested on rock liable to decomposition; and the sea in these cases has once more approached its former cliffs or margin. Along the shores of Fife there are beautiful illustrations of beaches well preserved, where the rock was well exposed in a way advantageous for resistance, and of their disappearance, where it was otherwise.

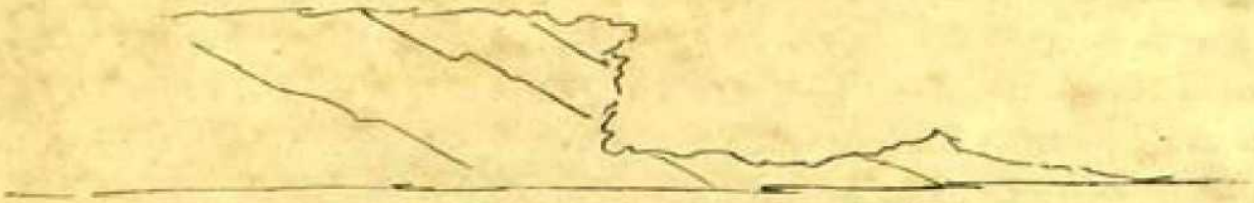
* Chambers's Old Sea Margins.—For the sake of brevity I have been compelled to speak very generally: it is the lowest and most recent of the Sea Margins with which I am dealing.

† Buist's Geological Survey of Perthshire.—Highland Society's Transactions, 1838.

‡ Jamieson's Journal, 1840.

§ Chambers's Old Sea Marigins.

Near Crail the rock dips under the sea, and exposes a surface



well suited to withstand the surge, and there accordingly we have extensive raised beaches with the old sea cliffs a considerable way inland. Near St. Andrew's, again, it is the reverse of this. The rock dips away from the sea,



and the upheaved beach has been worn away, the waves now attacking and abrading the old sea cliff. In this, again, ten or twenty feet up the cliff, we have caverns—Lady Buchan's at St. Andrew's, and that of Kinketh to the south, which doubtless opened out on the former beach, and were excavated by the surges of the ancient ocean.

I have rarely met with shell or gravel beaches off the mouths of our great rivers; the deltas or mud deposits have in these cases taken the place of the original beach, or covered or concealed it—or the whole has been eaten away again up to the verge of the purely fresh water deposits by the advance of the ocean. The alluvium of the deltas of our great rivers can only be accounted for on the hypothesis of upheaval. Streams, which run sluggishly, or are partially stagnant, may give us sandbank;—silt, such as that of the Ganges, the Taptee, the Indus, the Nile, &c., is only precipitated when the water in which it is suspended, is permitted *for some time* to remain in a state of absolute repose. Even were it otherwise, the deposit of silt must be restricted to the limits of the inundation, and yet in fact the inundation rarely extends over more than a mere fraction of the true alluvial delta. The same is the case with our carse lands in Scotland—clearly consisting of river-silt, yet of silt which could only have become accumulated and consolidated under water in a state of repose. The level of our delta,

and carses corresponds very closely with that of the most recent of our upheavals, of which I have no doubt they form a part.

I now come to the proofs of a descent having occurred anterior to the upheaval. It is, I think, nearly twenty years since Dr. Fleming described the occurrence of beds of peat, with tree-roots, obviously in situ,* both in the estuary of the Tay and the Bay of Lago.

The fangs and fibres of the roots are still entire, and as fast in the ground as when alive: the stumps protrude some distance, through the peat bed. Dr. Fleming seems at this time to have supposed that they were confined to the bed of the river; he does not seem to have been aware that the peat bed was found everywhere under the clay of the low carse, surmounted by from twenty to thirty feet of alluvium. Peat beds of a similar nature are found covered over with a deep layer of alluvium in the valley of the carse, and at Perth. Similar deposits occur at Mount's Bay in Cornwall, in Lincolnshire, and in Orkney. In 1837, in a report drawn up for the Highland Society, on the Geology of the South Eastern portion of Perthshire, I specially adverted to the circumstance of the occurrence of the beds of cockle shells under the silt, and above the peat and tree roots, which seemed to me only capable of being explained on the hypothesis that when the trees grew in the position now occupied by their roots, the surface of the land must have been at least ten feet higher than at present, so as to have placed them above the tide:—that a subsidence of at least twenty feet must have occurred, and that during this period the cockle bed came into existence; and, as the earth continued to descend, became buried in the mud which now covers it to the depth of ten feet:—that the movement must have next changed its direction, raising the cockle bed at least ten feet above its original position, bringing the Carse of Gourie sixteen or twenty feet above the sea, and elevating the tree roots to low water mark.

The phenomena around us at Bombay exactly correspond with those of the Carse of Gourie. The whole of our littoral formations consist of the concretes already referred to, or of loose sand and shells. From three to ten feet under this (the depth varies) is a bed of blue clay,

* The books at our command in India are few in number. I am unable to lay my hands on Dr. Fleming's papers: I quote from Dr. Anderson's account of the Geology of Fife, given in Swan's Review of Fife, Vol. I. page 215.

exactly similar to that with which our estuaries are being silted up. In a great majority of cases the blue clay is filled with the roots of the mangrove—a shrub which only grows within high water mark—avoiding water of more than four or five feet deep. The fangs and fibres of the roots are perfectly entire—some of the thickest of them, indeed, are but imperfectly decayed,—most of them are converted into a substance like peat; and when dried break with a conchoidal fracture and semi-resinous lustre something between jet and lignite. These roots and this arrangment is found to prevail all around the Island of Bombay, on many parts of the Island of Salsette, on the shores of the Gulf of Cambay, and at Kurrachee in Scinde. This state of things is not peculiar to creeks, bays, or estuaries; and can in no way be accounted for by the ponding back of water—it prevails all around the shores of our islands and estuaries into the interior as far as the gravel or concrete beds themselves, and is visible on those portions of our shores exposed to the full force of the ocean. It seems very probable that the New Holland trees described by Mr. Damier, and the Madeira Wood mentioned by Dr. Macaulay, may belong to the same class as the roots I have described, though I have not felt warranted in adducing them as proofs of the hypothesis.

I am satisfied that to this variety of objects the lignite, found near Cochin in lat. 8°, belongs; and that, were our shores examined, it would be found at intervals everywhere along them. In Scotland at Perth, in the Carse of Gourie,* in the carses of Falkirk and Sterling, under the present city of Glasgow, and along the banks of the Clyde, boats and canoes have been dug out from under ten to twenty feet of alluvium, and still ten or twenty feet above the level of high water. Mr. Chambers infers from these things, and I think most conclusively, that the habitation of our island took place before the last thirty or forty feet of its elevation was gained from the ocean. May we not go further than this:—from the relations of these relics of human art to the peat beds and submerged forests around is it not probable that the depression under review was in progress within the human period?

The absence of roots in situ is no proof of a depression never having occurred: at the present moment, for every fifty yards we have mangroves, we have at least 1000 where there are none; and on abrupt,

* Chambers's Old Sea Margins, page 19.

sandy, or rocky shores, wherever indeed the locality is unfavorable for the collection of mud and the growth of vegetables, we can have no direct proof of depression.

If, as I have shown, we have the old sea margin of nearly uniform character, aspect, and elevation, presenting itself every where, it is not surely too great a stretch of inference to conclude that the depression was, like the upheaval, not local but general, and that they everywhere accompanied each other.

This theory of double movement completely solves all the mysteries attendant on the formation of coral reefs—the general descent permitted beds of coral of very great thickness to be formed, the ascent brought the whole again to the surface, or above it.

This paper was prepared for the Edinburgh meeting of the British Association. Just after its despatch by the Mail of the 26th July, I found that the meeting of the Association would be long over before it could arrive, and so sent a copy to the Asiatic Society of Bengal. It is necessary to state this and explain the multitude of allusions contained in it to the geology of the East Coast of Scotland—a locality but little known, in all likelihood, to the bulk of the members of the Society.

Aborigines of the North East Frontier.

To The Secretary of the Asiatic Society.

Darjiling, Sept. 16th, 1850.

Sir,—I have the honour to enclose another series of Vocabularies obtained for me, by the Rev. N. Brown of Sibságor, in furtherance of my plan of exhibiting to the Society, a sample of the lingual affinities of all the Aborigines of India, on an uniform plan. The present series comprises four dialects of the Nágá tongue,—the Chútia, the Ahóm, the Khámti, the Láos,—and the Siamese. My valuable correspondent Mr. Brown has favoured me with the following remarks, on the present occasion.

"The first four columns of the table complete the variations, priorly given, of the strangely corrupted Nágá language. This tongue affords an extraordinary exemplification of the manner in which an unwritten language may be broken up even upon a small extent of territory. On

the other hand, in the great Tái family we have a not less striking instance of the preservation of a language in almost its original integrity and purity, through many centuries, and in despite of a vast territorial diffusion; for, from Bankók to Sadiyá, along the Meinám, Salwén, Irawádi, and Kyendwen rivers, up to the sources of the Irawádi, through 14 degrees of latitude, there is but one language, notwithstanding the diversity of Governments under which the speakers of it live.

"The Míthan and Tablúng Nágás (see table) reside on the hills east and north of Sibságor. The Kháris descend upon the plains near Jórhát. They are superior much to the other Nágás. The Jabokas and Banferas are the neighbours of the Mítháns, with nearly similar tongues. The Angámis occupy the southern end of the Nágá country. The Chútia is the language of one of the old tribes of Assam, now nearly extinct. The Ahóm also is nearly extinct as a spoken tongue. The present Ahóms of Assam, descendants of the conquerors, still form one of the largest portions of its population. But their language, as well as their religion, has been relinquished for those of the Hindus. Their ancient creed had little resemblance to Buddhism or to Bráhmaṇism. The Khámtis retain their tongue but have lost their creed. They have accepted Buddhism from the Burmas, from whom they have likewise borrowed many new words.

"In answer to your queries I can but say, at present, that I highly appreciate the importance of a standard for the Indo-Chinese tongues. But which language has the best claim to be constituted such I do not know. I should be inclined, however, to assume the Burmese, which is at least *half brother to the Tibetan*. This would bring the Tibetan, the Lhópá or Bhútánese, the Burmese, the Singhpho, the Nágá, &c., into a kind of family union. The Siamese Shyán, or, as the people themselves call it, the Tai, cannot be brought into the same category. It has little or no affinity with the neighbouring dialects, and may represent another whole class of languages not yet ascertained. It is probably allied to the Chinese and is in importance not inferior to the Burmese."

I am, &c.

B. H. Hodgson.

	Mithan Nágá.	*Tablung Nágá.*	*Khari Nágá.*	*Angami Nágá.*	*Deoria chutia.*	*Ahom.*	*Khamti.*	*Laos.*	*Siamese.*
Air	rangbin	wang yak	aning	tikhe	beni	lóm	lóm	lóm	lóm
Ant	tiksá	tik há	hungzah	hache	chimechi	nyuchu	mót	mót, puak	mót
Arrow	sán	láhan	takaba	thiwu	átá	lem	lim	lempün	lukson
Bird	ó	óuhá	ozah	pará	duá	nuktú	nók	nók	nok
Blood	áji	ih	ai	unhi	chui	let	lût	leut	leuat
Boat	khóa	iseng	aróng	ru	nu	ru	hû	heu	reua
Bone	rhá	wan	taret	uru	pichoŋ	tau	nuk	dúk	kaduk
Buffalo	loi	tek	apang	rali	mé	khrai	khwai	khwái	khwái
Cat	miáh	ami	mochi	nunno	midige	men	miau	meau	meau
Cow	máhu	máhu	masü	mithu	mósu	hu	ngó	ngóa	wóa, ngóa
Crow	okhá	ausapa	waru	chejá	duká	ká	ká	ká	ká
Day	anyí	tiní	asónga	tiso	sánjá	bán	wan	wan	wan
Dog	hí	kui	ai	tasû	shi	má	má	má	má
Ear	ná	ná	tenhauŋ	anye	yáku	pik	hú	hú	hú
Earth	háwán	katok	alí	kije	yá	din	langmin	dín	phendin
Egg	otí	kek	ansû	podzû	dujá	khrai	khsi	khai	khai
Elephant	lóak	lok niu	sati	tsu	meu	tyáng	tsáng	tsang	chang
Eye	mik	mik	tenik	amhi	mukuti	tá	tá	tá	tá
Father	apá	opáh	tabá	apó	tsipá	po	po	po	po
Fire	van	áh	matsü	mi	ŋye	fai	fai	fai	fai
Fish	ngiá	nyále	angbá	kho	tsingá	plá	pá	pá	plá
Flower	maipóa	chupeng	tabeu	popu	ibá	blok	mok	dok	dokmai
Foot	tchyá	yah lan	tachang	uphi	yápásu	tin	tin	tín	tin
Goat	rón	yun	nabóng	tanû	lipeduru	pengá	pe	pe	pe
Hair	khó	min, su	kwá	atsü thá	kiŋ	phrum	phóm	phóm	phóm
Hand	chak	yak	takhet	abi	ótuŋ	khá	mû	mû	mû
Head	kháng	sang	telim	atsû	gubong	rú	hó	hó	hóa
Hog	vak	ak	suk	thavo	chu	mu	mú	mú	mû
Horn	róng	wong	tih	pokhye	nu	khau	khau	khau	khau
Horse	man	kowai	kungri	chekwir	góri	má	má	má	má
House	ham	nok	aki	ki	ŋyá	ren	hún	heun	reuan
Iron	jián	yan	ayin	je	sung	lik	lék	lek	lek

	Mithan Nágá.	*Tablung Nágá.*	*Khari Nágá.*	*Angami Nágá.*	*Deoria. chutia.*	*Ahom.*	*Khamti.*	*Laos.*	*Siamese.*
Leaf	pan chak	phum yak	tuwá	ponye	chiá	bóu	maü	bai	bai
Light	rangai	nining	snaugo	ngukwi	dákári	leng	leng	leng, tseng	sawang
Man	mí	sauniak	ami	theme	mósi	kun	ḳun	khón	khón
Monkey	mainuk	simai	kishá	takwi	iku	laling	ling	wok, ling	líng
Moon	letnu	le	leta	kharr	yáh	den	lūn	deun	tawan
Mother	ánnu	onu	tū	azo	tsimá	me	me	me	me
Mountain	....	....	apih	chaju	asū	doi	noi	loi	pukhau
Mouth	tun	chusim	tabaun	amü	dumju	sup	sóp	pák	pák
Musquito	....	....	mrilá	viru	dán	phreng	yung	yung	yung
Name	man	min	achu	nzá	mu	chu	tsu	tsü	chū
Night	rang nak	vang niak	áyáh	tizí	siri	dam	khūn	khūn	khūn
Oil	mangá	maugá	tutsū	kakizu	tu	man ngá	nam, man	nam, man	nam, man
Plantain	....	....	mangó	tekwasi	tūzu	kui	kúe	kue	klue
River	shuá	yang nú	atsū	kharr	ji maji	khe	khye nam	nam me	mé nam
Road	lam	lam	ndi	cháh	tságu	táng	táng	tang	tháng
Salt	hum	hum	machi	matse	sün	klu	kü	keu, kem	kleüa
Skin	khóan	soh	tagap	bikhr	chikun	plek	nang	nang	nang
Sky	....	....	aning	thi	pichoni	fá	fá	fáfón	fá
Snake	pu	pu	ahū	thinhye	dubu	ngó	ngú	ngu	ngú
Star	lethi	cháhá	peti	themū	jiā	dau	náu	láu	dáu
Stone	lóng	yóng	alóng	kache	yatíri	frá	hin	hin	hin
Sun	rang hán	wang hí	suhih	nakhi	sánh	bán	wan	kang wan	tawan
Tiger	chianú	sahnu	akhü	takhu	mesá	sú	sü	seu	süa
Tooth	vá	phá	taphá	uhu	háti	khiu	khiu	khiau	fan, khiau
Tree	pan	peh	sundóng	sí	popon	tun	tun	tón	tón
Village	ting	tying	ayim	arame	átigu	bán	mán	ban	ban
Water	ti	riang	atsū	zū	ji	nam	nam	nam	nam
Yam	....	....	....	....	....	....	man	hóaman	man dóm
I	ku	tau	ní	á	án	kau	kau	óng, ku	khá
Thou	nang	nang	nang	no	no, áni	mó	maü	tóa	tua, müng
He, she, it	mih	taupá	pau	me	bareni	heu	man	man, tan	khon, man
We	....	....	akau	áwe	járuraú	rau	hau	hau	rau

	Mithan Nágá.	*Tablung Nágá.*	*Khari Nágá.*	*Angami Nágá.*	*Deoria chutia.*	*Ahom.*	*Khamti.*	*Laos.*	*Siamese.*
Ye	....	....	nikhala	notoleli	jákugroni	khau	maü sú	....	su
They	....	....	tungkhala	tothete	bário	khreu	man khau	....	khau ar ai
Mine	kukuhe	tesei	ní	....	ányo	au	kau	....	....
Thine	....	....	nang	....	níyo	mó	maü	....	....
His	....	....	....	....	biyo	heu	man	....	....
One	áttá	chá	akhet	po	dugshá	ling	nüng	nüng	nüng
Two	ányí	íh	anne	kane	dukuni	sang	song	song	song
Three	ázam	lem	asam	sü	dugdá	sam	sám	sám	sám
Four	álí	pilí	phalí	deh	duguchí	sí	sí	sí	sí
Five	ágá	ngá	phangá	pangu	dugumua	há	há	há	há
Six	árok	vok	tarók	sóru	duguchu	ruk	hók	hók	hók
Seven	ánath	nith	tani	thene	duguchi ?	chit	tset	tset	chet
Eight	áchet	thath	sachet	thetha	duguche	pet	pet	pet	pét
Nine	aku	thu	tekü	thaku	duguchuba	kau	kaü	kau	kau
Ten	ban	pan	tarah	kürr	duguchuba dugshe	sip	sip	sip	sip
Twenty	chá	....	makhi	makü	....	sau	sau	sáu nüng	yé sip
Thirty	....	....	samrá	sürr	....	sam sip	sám sip	sám sip	sám sip
Forty	panyí	....	lírah	lhide	....	si sip	sí sip	si sip	sí sip
Fifty	....	....	tanam	ripangu	....	há sip	há sip	há sip	há sip
Hundred	pugá	....	rukrá	kre	....	pak	pák	hoi	roi
Of	....	....	(wanting)	....	....	(wanting)	(wanting)	....	thi
To	....	....	ná	....	....	....	hang, ti	....	ke
From	....	....	bine	....	....	....	luk	....	té
With	....	....	ashe	....	....	chum	....	....	duei
In	khá	sah	gü	kinu	chikími	khau	kannü	nai	nai*
On	....	....	tamüge	....	pichoni	nu	nau	neu	bón
Now	atha	cháha	hikü	akihawe	derereni	tinai	tsang, ngai	leng	reu, than chai
Then	....	....	jikü	lilitiha	deremai	tamnai	....	....	müa
When ?	....	....	kuim	tadzune	dumoni	phreu nai	....	....	müa dai
To-day	anyí	tinyi	thani	teje	dinineni	banai*	....	wanni	wan ní
To-morrow	nai ní	ngai ni	asang	thedu	disuini	sang manai	maphók	phuk	phrungní
Yesterday	manyi	manyi	hashí	koshe	dupuroni	poi	mangá	....	wa, wán

	Mithan Nágá.	*Tablung Nágá.*	*Khari Nágá.*	*Angami Nágá.*	*Deoria chutia.*	*Ahom.*	*Khamti.*	*Laos.*	*Siamese.*
Here	....	....	nikó	haki	lohore	u, tinai	phe, thai	ní	ní
There	....	....	wadengü ojü	lithe	hobóng	tet	hanpun	....	thi nau
Where?	pau pu	tau wai	kuchi	kiraporú	boróng	hó	thaü	tinai	thi nai
Above	ding	kawang	tamachingu	bale	picho	nu	kan lu	pin	bón
Below	hópang	opang	tamóksing	chakise	kumo	lep	....	lum	tí
Between	....	....	tiong	....	....	klang	....	....	wang
Without	....	....	takigü	kite	bajüni	bí	....	....	thi nok
Within	....	....	tisinge	kinu	chikimi	khauju	tinaü	....	thinai
Far	atai	kátike	uragu	chawé	asain	jau, sai	kai	kaí	kli
Near	hole	ótike	anhagu	chaguno	butugain	klai	kaü	kai	klai
Little	ohipia	echinghá	ichadango	katuno	poiani	chut	lek, kye	....	leknoi
Much	taihu	eselai	kwalangau	kyapür	poini	rá	nam	nak, lái	lai, bundá
How much?	....	....	kuia	kichuru	amcha	....	....	kilam	ki lem
Thus	....	....	itangó	tsawe	lakireni	plai	nang nai	....	yang nan, chen
How?	....	....	kotisaü	nokidihika	dakang	....	....	....	thau, phrá het
Why?	....	....	chibatsawi	kaji	damno	wá	....	....	phrá aurai
Yes	vai	aiya	hau	e	hoi	khewo	tsaü	tsai, men	khá
No	mantai	mang cha	nongó	mowe	hóya	bukhewo	ma tsaü	bo tsai	míchi
Not	....	....	tá	....	dá	bu, ma	le, tak	bo, mai, yá	mí, yá
And	....	....	....	....	....	....	....	le	le, kap, tak
This	hi ha	thoi nan	pio	hawe	taihoni	iu	an nai	ní	ni
That	hi ha	thoi theo	poicho chu	liwe	bare	heu	an nan	nan	nan
Which?	....	....	kubai	kiuru	boroshini	panku	an naü	....	khondai
What?	tem	toí nan	chabaü	kaje	damdarini	re	sang	sang	arai
Who?	oveh	owai	sui	soru	basani	phreu	phaü	khai, phai	khrai, süng
Any thing	....	....	kuiai	kajipuru	damasirini	....	....	asang	arai
Any body	....	....	koi mürh	chakra paru	shámádu	pheu	kan phong	....	....
Eat	sá há	háchi	tsaung	chiliche	harini	kin	kin	kin	kin
Drink	singhá	yang ying shi	atsióng	dzü kretowe	jinime	kleu	kin nam	kin nam	deum
Sleep	jipdau	chunshi	ipigili	zü	yumg arini	non	non, nap	non, lap	lap
Wake	....	....	sishaugó	sirte	harnamani	teng	tün	tün	tün
Laugh	nile	nichi	manitli	nu	hatukari	khru	khó	háu, khóa	hóaro

	Mithan Nágá.	*Tablung Nágá.*	*Khari Nágá.*	*Angami Nágá.*	*Deoria chutia.*	*Ahom.*	*Khamti.*	*Laos.*	*Siamese.*
Weep	saple	saptike	chipli	krá	ugarini	hai	hai	hai	rong hai
Be silent	....	....	tukurá	chasibale	turucha	supmu	yú tsip tsip	dak dak yú	ning yú
Speak	káh	táh	aihushang	pusiche	icharini	bok	wá	pak	phut
Come	ráhai	ongkoi	hinnerang	akiphirche	nangkwá	má	má	má	má
Go	tóng	angsi	wá	totache	ákená	ká	ká	pai, men	pai
Stand up	ajóng	yong chi	hunligili	thale	tákarini	tí	sau	song	yün
Sit down	ngó dau	um chi	manio	bache	dudurini	nang	nang	nang	nang
Walk	tóng, khá	angsi	róng chwa	tothe	kerurini	ká	pai	men	dün
Run	rikle	phal chi	semekwa	mhathele	jononini	paikhan	len	len pai	wing pi
Give	láhai	yakhu	khiugó	sūwawe	larini	heu	haū	hū	hai
Take	paule	yakei	hiraugó	khriliwe	lario	au	au	au	au, nap
Strike	maithun	set chi	yakchau	vashuwe	borini	dá, po	po	tí, bup	tí, boe
Kill	langdau	toi chi	yaksitógó	dukhiawe	botechiro	potai	au tai	khá	khá, au tai
Bring	láhai	yakei	heneratli	seyawe	larini	ánmá	au má	aumá	au má
Take away	pai pau	noh si	heneraugó	satele	laromni	sung	sóng	sóng, thü	thü
Lift up	laukó	noh si	chungótsó	tupele	lagaromni	yok, tang	yó, yóng	yá	yók
Hear	athak	chai ha	jaugó	silowe	kanatori	nyin	ngin	nyin	dai yin
Understand	avan	tau singpu	metechau	siwe	takarini	hú	hú, thom	rü, hū	rú
Tell	....	....	....	....	....	bok	wa	wá	bok wá
Good	maile	mailunke	aró	viwe	churini	dí	ní	dí	dí
Bad	manmai	yemei	maró	sowe	chani	khyá	maní	hái, bodí	chua, mai dí
Cold	ráng kham	wang sam	aiyang	sí	chepepe	khye, náu	yen	náu, yen	yen, náu
Hot	kham	shem	tetsá	khakwu	kaini	ran, lut	hon, mai, lüt	hon	ron
Raw, (green)	....	....	tachim	memo	pijo	lip	nip	dip	dip
Ripe	jum	yim	tenbing	me	munom	rung, suk	súk	súk	súk
Sweet	tí	urang	miang	che	jiri	oi	wán	wán	wán
Sour	shí	sí	tehsan	khye	sitotoi	sum	sóm	sóm	sóm, preo
Bitter	khá	khá	khá	chási	kai	khum	khóm	khóm	khóm
Handsome	....	....	Rubaitaró	visu	ichubare	khyeng	ngám	ngám	ngám
Ugly	....	....	maró	shopur	üchini	khye plá	háng hai	hai	rái
Straight	....	....	mathunjau	thekhá	pune	ú	nan	....	trong, sü
Crooked	kom	kom	tikihang	krewi	kekurai	ke, ngok	ngok	kom, kót	ngo

	Mithan Nágá.	*Tablung Nágá.*	*Khari Nágá.*	*Angami Nágá.*	*Deoria chutia.*	*Ahom.*	*Khamti.*	*Laos.*	*Siamese.*
Black	nak	niak	nak	kati	sakokoi	dam	nam	dam, nin	dam
White	thoh	heng	mesing	kacha	puri	phók	kháu, phūk	kháu, pheuk	kháu
Red	....	....	tamûram	mrí	saru	deng	neng	deng, kam	deng
Green	....	....	shim puluk	kapaje	pijoni	kyí	khyeu	kheau	kheau
Long	ló	lau	tilhaun	josū	lui	lej au	yáu	yáu	yáu
Short	mau	soh	tütsizau	jü	sutugai	lot	lot	san, hun	san
Tall, (high)	chóak	tau	oregu	karkhre	suini	sung	sung	sung	súng
Short, (low)	....	....	orejute	khar uo	patigaini	tam	tam	tam	tam bóa
Small	ahipia	sui	minghaji	kanachapo	suru suroni	noi	lek, on	lek, noi	lek noi
Great	achung, nau	yong nong	tahpetiau	jopūr	am chá dini	lóng	lung, yaū	luang, yai	luang, yai
Round	....	....	meketang	khruhi	tumóru	klóm, pán	món	kóm	klóm
Fat	chóng	nittan	tabiti	pomoja	mejirini	pí	pí	pí, tui	sai, man
Thin, (lean)	....	....	achi	soponoru	dugumjini	heng	yom	....	mai man

*Conspectus of the Ornithology of India, Burma, and the Malayan peninsula, inclusive of Sindh, Asám, Ceylon, and the Nicobar islands.** —*By* E. Blyth, *Esq.*

Order II. RAPTORES.

Tribe DIURNÆ.†

FAM. FALCONIDÆ.‡

Subfam. FALCONINÆ.

Genus Falco, L. (as restricted).

A. With longer caudal feathers.§

* Continued from p. 239, *ante*.

† In addition to the obvious external characters which distinguish the diurnal from the nocturnal birds of prey, and the well known differences in the skeleton, the alimentary organs exhibit certain constant differences of structure. Thus the *Diurnæ* have invariably a large craw or dilatation of the œsophagus, and two very minute *cæca coli*; while the *Nocturnæ* with a wider œsophagus have no dilatation of it whatever, and invariably two considerably developed cæca, resembling those of the *Meropidæ*, *Cuculidæ*, *Trogonidæ*, and *Caprimulgidæ*. These distinctions are important as being absolute, presenting no gradation from one type of structure to the other. Prof. McGillivray first brought them adequately into notice.

‡ The Eagle and Falcon family subdivides most naturally, as we conceive, into ten subfamilies, as follows.

1. Falconinæ. Comprising the genera *Falco*, *Hypotriorchis*, *Tinnunculus*, *Ieracidea*, *Hierax*,* and *Harpagus (?)*
2. Perninæ. *Aviceda*, *Pernis*, *Cymindis*, and *Rostrhamus*.
3. Elaninæ. *Elanus* (including *Gampsonyx*), *Nauclerus*.
4. Circaëtinæ. *Circaëtus*, *Cachinna*, *Hæmatornis*, *Polyboroides*, *Serpentarius*.
5. Circinæ. *Circus*.
6. Accipitrinæ. *Meliërax*, *Ichnoscelis*,† *Accipiter*, *Micronisus*, *Micrastur*, *Astur*.
7. Thrasaëtinæ. *Pseudastur*,‡ *Thrasaëtus*, *Morphnus*. *Spizaëtus*.
8. Aquilinæ. *Entolmaëtus*, *Aquila*, *Ictinaëtus*, *Hieraëtus*, *Archibuteo*, *Buteo*, *Poliornis*.
9. Haliaëtinæ. *Pandion (?)*, *Pontoaëtus*, *Blagrus*, *Haliaëtus*, *Helotarsus*, *Haliastur*, *Milvus*, *Ictinia*.
10. Polyborinæ. *Milvago*. *Polyborus*, *Craxirex*, *Buteogallus*, *Urubitinga*, *Ibycter*, *Daptrius*.

§ This at least is M. Schlegel's arrangement; but we do not think that his *Sacre*, *Lanner*, with the African *F. biarmicus*, and the Australian *F. subniger* and *F. hypoleucos*, and probably others, should rank immediately with the Jer Falcons.

* *Falco semitorquatus*, A. Smith, exemplifies, we conceive, another generic type of pygmy Falcons.

† *Ischnoscelis*, Strickland (1844), is rejected by Mr. G. R. Gray in favor of *Geranospiza*, Kaup (1847).

‡ Type, *Falco pœcilonotus*, Cuvier, v. *F. scotopterus*, Pr. Max. (*Pl. Col.* 9).

15. *F. CANDICANS* (?),* Gmelin (*Pl. Enl.* 446).

SYN. *F. groenlandicus,* Brehm, Hancock.

Shangar, Hind.

HAB. Northernmost regions of both continents, visiting the adjacent countries in winter.

Remark. The *Shangar* of eastern works on falconry, stated to be "very rarely met with in India, not more than one or two in a century, and then generally in the Panjab," would seem to be this species, which Dr. Schlegel accepts as distinct from F. GYRFALCO, and regards as a permanent variety of it, the F. ISLANDICUS of Brehm and Hancock.

16. *F. SACER,* Schlegel (Gould's *B. E.* pl. 20; Hardw. *Ill. Ind. Zool.*)

SYN. *F. lanarius* apud Temminck and Gould.

F. cherrug, Gray.

Cherrag, H.

HAB. Himalaya, very rare; Tahtary; E. Europe.

Remark. I think there can be little if any doubt that this Himalayan (or rather, it would seem, chiefly Tahtarian,) species is the Sacre Falcon, as determined by Dr. Schlegel.†

17. F. LANARIUS (?), Schlegel, nec Lin., nec Temminck (Hardw. *Ill. Ind. Zool.*, adult; Jerdon's *Ill. Ind. Orn.* pl. 44, young).

SYN. *F. abietinus,* (?), Bechstein.

F. juggur, Gray.

F. luggur, Jerdon.

Juggur Falcon, and probably also *Justin Falcon,* Latham.

Jhaggar, male, *Laggar,* female, Hind; *Laggádú,* Telegu (Jerdon).‡

HAB. India generally, common; and, if the true Lanner Falcon as determined by Dr. Schlegel, also S. E. Europe, and probably therefore the intervening countries.

* The Italic capitals indicate that the author has examined no Indian example of the species so distinguished.

† Buffon's figure of *le Sacre (Hist. des Oiseaux,* pl. 14,) might pass for that of a *young* Laggar, only that the latter has no spots on the outer webs of its tail-feathers, and there is a distinct though small moustache. It probably represents a young Cherrag. *N. B.* The legs of a young Laggar are leaden-blue, those of the adult yellow.

‡ The name *Lanner* may possibly be a corruption of *Laggar.*

Remark. This species is very closely affined to the African F. BIARMICUS, Tem., to which Mr. Strickland *(in epistolâ)* refers as synonymes *F. peregrinoides*, Tem., *F. chiqueroides*, Smith, *F. Feldeggi* et *F. lanarius*, Schlegel, *F. rubeus*, Thienemann, and *F. cervicalis*, Kaup. "The *only difference* I can find," he adds, "between *F. juggur* and *F. biarmicus*, is that the former has the tibial plumes uniform dark brown at all ages, while *F. biarmicus* has them cream-coloured or white, like the rest of the under-parts, with a small brown spot on the centre of each feather." The name *F. biarmicus* occurs in Mr. Vigne's list of birds procured in Kashmir and Little Tibet, *P. Z. S.* 1841, p. 6; and the name *F. peregrinoides* in Mr. G. R. Gray's Catalogue of the birds presented by Mr. Hodgson to the British Museum: but the specimen referred to in the latter instance is not indicated by that name in the same gentleman's second and improved catalogue of the whole collection of *Raptores* in the British Museum. Dr. Schlegel remarks that his *F. lanarius* is closely affined to *F. biarmicus*, "mais elle s'en distingue constamment par les teintes. Il paraît aussi que la première rémige est, proportions gardées, un peu plus longue dans le Lanier que dans l'espèce du Cap."

B. With shorter caudal feathers.

18. F. PEREGRINUS, L. (*Pl. Enl.* 421, 430, 469, 470).

SYN. *F. barbarus*, L.

F. gyrfalco, L., *Faun Suec.*, p. 23, No. 64. } apud Schle-
F. lanarius, Pennant, *Brit. Zool.* I, 221. } gel.

F. communis, Brisson.

F. hornoticus et *F. ater*, Gmelin.

F. lunulatus, Daudin.

F. cornicum, Brehm.

F. calidus, Latham (India).

F. puniceus, Lev. (S. Africa), apud G. R. Gray.

F. anatum, Bonap. (N. America).

Bauri, female, *Bauri Batcha*, male. H.; *Raja Wali*, Malay (perhaps the next species); *Sikap Lang*, Sumatra (ditto); *Laki Angin* of the Passummahs (Ditto, Raffles).

HAB. Warm, temperate, and moderately cold climates of both hemispheres; though a plurality of affined races certainly exist: those

of S. Africa are constantly smaller. Common in India, many adults remaining in Lower Bengal during the cold season, and especially frequenting the vicinity of lakes and marshes, to prey on the water-fowl which resort to them; hence they are tolerably numerous in the Bengal *Sundarbans*.

Remark. "India, Europe, and N. America on the one hand, and Cape Horn, the Cape of Good Hope, and Australia on the other," writes Mr. Gould, "are all inhabited by Falcons so nearly allied to each other as to favor the opinion that they are merely varieties of each other; but I agree," he adds, "with the Prince of Canino and Professor Kaup in considering them to be distinct, and representatives of each other, in the respective countries they inhabit." *Introduction to the Birds of Australia.*

We consider the Australian species—F. MELANOGENYS, Kaup, (v. *macropus*, Swainson,) to be decidedly distinct from *F. peregrinus;* but strongly suspect that Mr. Gould here refers to the *Shâhin* as the Peregrine Falcon of India. The latter is undoubtedly distinct from *F. peregrinus*; but whether so from *F. melanogenys* is doubtful. Dr. Schlegel would appear to consider these to be the same. Of his *F. communis (peregrinus)*, he writes—"Il paraît que cette espèce est répartie dans presque toutes les parties du globe, mais qu'elle forme, suivant les contrées qu'elle habite, des races plus ou moins disparates. Les Faucons Communs, par example, que produit l'Afrique méridionale, quoique tout-à-fait sembables au nôtre par leur organization et leurs teintes, sont constamment d'une taille moins forte, la femelle du Faucon Commun du Cap ne surpassant pas en grosseur le mâle de notre Faucon d'Europe. Quant au Faucon Commun de l'Amerique du Nord (voir Wilson, pl. 76, et Audubon, pl. 16), Ch. Bonaparte (List, p. 4,) le sépare du nôtre sous le nom de *Falco anatum*, toutefois sans motiver son opinion. Il paraît eu effêt que ce Faucon d'Amerique s'eloigne du nôtre par de légères différences dans la distribution des teintes, en ce que ces teintes sont dans le premier, sur les parties supérieures, d'un brun foncé, sur le dessous d'un brun ferrugineux pàle, et que le noir de la tache en moustache s'étend ordinairement sur toute la région des oreilles. Mais il existe également dans l'Amerique du Nord des Faucons que resemblent parfaitement au nôtre par leurs teintes; j'ai vu un pareil individu dans les galeries du Musée de Berlin. Les Faucons Communs qui viennent du grand Archipel des Indes" (*F.*

peregrinator?) "et de la Nouvelle Hollande paraissent se rapporter à ceux de l'Amerique du Nord, et n'en différer que par la teinte noirâtre, souvent uniforme des parties supérieures; cette variété a été décrite et figurée par Gould sous le nom de *Falco melanogenys*, dans son ouvrage sur les oiseaux de l'Australie. Nous en possédons six individus dont deux femelles seulement offrent une distribution semblable à celle que nous venons d'indiquer; les quatre autres, tant mâles que femelles, ressemblent parfaitement au Faucon Commun d'Europe. Il me semble, d'après ce que je viens de dire qu'en érigeant au rang d'espèces les variétés dont nous venons de parler, il convient également de separer de notre Faucon la variété à joues noires, qui se trouve en Europe."

So far as we are aware, the Indian *Bauri* differs in no respect whatever from the Peregrine Falcon of Europe, and has never (so far as we have seen) the wholly black cheeks: but the *Shâhin* has the latter generally and tending so always, and in other respects approximates *F. melanogenys* of Australia; we suspect, however, that it never attains the size of some females of that bird (and also of *F. peregrinus*), and that the colour of its abdominal region is much deeper, while the markings of the entire under-parts of the Australian species (so far as we have seen, and as represented in Gould's figures,) are more strongly brought out and much broader than in either *F. peregrinus* or *F. peregrinator*. Moreover as the two latter unquestionably distinct (however closely affined) species inhabit India, so there may be a plurality of equally affined species in other countries, very probably affording the solution of the difficulties suggested by Dr. Schlegel.*

19. F. PEREGRINATOR, Sundevall (Jerdon's *Ill. Ind. Orn.* pl. 12, 28).

SYN. *F. shaheen*, Jerdon.
F. sultaneus, Hodgson.
F. ruber indicus, Aldrovandi.
F. melanogenys (?), Kaup.
F. macropus (?), Swainson. } Australia.

* The ordinary haunts of *F. peregrinus* and *F. peregrinator* differ. Thus, Mr. Jerdon (a most experienced observer) remarks—"Whilst the Bhyree (*F. peregrinus*) prefers the sea-coast and the neighbourhood of lakes, rivers, and wet cultivation, and the Shaheen (*F. peregrinator*) delights in hilly and wooded regions, the Juggur, on the contrary, frequents open dry plains, and the vicinity of cultivation." *Ill. Ind. Orn.*

Sháhin ('Royal'), female; *Koëlá* ('charcoal'), male; H.; *Jawolum*, Telegu; *Wállár*, Tamul (Jerdon).

Hab. India generally; chiefly the hilly parts: much more rare in Lower Bengal than *F. peregrinus;* Afghanistan; Malay countries? Australia?

Remark. We have doubtfully cited the names applied to the Australian type, which we are far from satisfied is distinct; although our impression nevertheless is that the latter differs constantly from the Indian *Sháhin* as already indicated.

C. Of feebler conformation.

20. F. chicquera, Shaw (Lev. *Ois. d'Afr.*, t. 30, Gould's 'Century,' pl. 2.)

Syn. *F. ruficollis* et *F. macrodactylus*, Swainson.
F. cirrhatus, var., and *Fasciated Falcon*, Latham.
Tarmatti, (*Turumtee*, Jerdon; *Toomtra*, Burnes,) female; *Chetwá*, or *Chetoya*, male; H.

Hab. Asia and Africa; common in India.

Remark. This species is ranged in *Hypotriorchis* by Mr. G. R. Gray. We much prefer to retain it in restricted *Falco*.

Genus Hypotriorchis, Boie.

21. H. severus (*Pl. Col.* 128).

Syn. *Falco severus*, Horsfield.
F. Aldrovandi, Reinwardt.
F. guttatus, G. R. Gray.
F. rufipedoides, Hodgson.
Jhuter (quære *Játá*, 'there goes' or *rushes*), H.;
Allap Allap Gingeng, Jav. (Horsfield).

Hab. Himalaya, Java, Philippines: visiting the plains of Lower Bengal in the cold season, where somewhat rare.

22. F. subbuteo (Gould's *B. E.* pl. 22.)

Syn. *Falco subbuteo*, L.
F. barletta, Daudin.
F. pinetarius, Shaw.
F. hirundinum, Brehm.
Karjanna, H. (Hodgson); *Surkhpushtak* ('rufous-vent') of Kabul (Burnes).

Hab. Europe, Asia, and Africa: visits Lower Bengal in the cold season, where far from common. We have seen it from China.

Remark. This and the preceding species are chiefly seen about and after sunset, and doubtless also therefore about sunrise. A crepuscular tendency which has already been noticed of the Hobby by Capt. Drummond.*

Genus Tinnunculus, Vieillot.

23. T. alaudarius (Gould's *B. E.* pl. 26).

Syn. *Falco alaudarius*, Brisson.
F. tinnunculus, L.
F. fasciatus, Retzius.
F. brunneus, Bechstein.
F. rufescens, Swainson.
F. interstinctus, McClelland.
Cerchneis murum, *C. media*, et *C. tinnuncula*, Brehm.
Germatiá, *Gerimatiá*, *Kharumatiá*,† *Kurroutia*, *Karontia*, and *Narzi-narzának* ('tête á tête?'), H.; *Nardunak*, Sindh (Burnes); *Gyo-thin*, Arakan (Phayre); *Allap Allap Sapi*, Jav. (Horsfield); *Raja Alia* (often used as generic for all Hawks), Ceylon (Layard).

Hab. Europe, Asia, and N. Africa: very common in Lower Bengal, where frequently seen in parties of 20 or 30 individuals, beating over the cultivated lands.

Remark. We have seen no Indian Kestrels, that were distinguishable in any way from European specimens in corresponding plumage; but a presumed female from Ye (Tenasserim) is remarkable for the very great breadth of the black markings of its plumage, and may perhaps therefore and probably appertain to a distinct race.

24. T. cenchris (Gould's *B. E.* pl. 27.)

Syn. *Falco cenchris*, Naumann.
F. tinnunculoides et *F. xanthonyx*, Natterer.

* Vide *Ann. Mag. N. H.* 1843, p. 423.

† These names, applied by Buchanan Hamilton to the common Kestrel, properly belong (we suspect) rather to No. 20, and are obviously the same as *Tarmatti* there cited. The term *Gerumatia*, however, evidently derives from *Gerumati*, orange or ochreous-yellow earth, and is therefore applicable to either.

F. tinnuncularius, Vieillot.

F. Naumannii, Fischer.

F. gracilis, Lesson.

HAB. The warmer parts of Europe and Asia; also N. Africa. In India, found chiefly on the sub-Himalayas, Nilgiris, and other high land; though far from uncommon in Lower Bengal (perhaps in the rainy season only).*

25. T. VESPERTINUS (*Pl. Enl.* 431; Gould's *B. E.* pl. 27.)

SYN. *Falco vespertinus*, L.

F. rufipes, Beseke.

F. subbuteo, var., Latham.

HAB. Europe, Asia, and N. Africa. In India, as the preceding species, to which it is closely affined in all but colour. Both appear to be wholly insectivorous.

Genus HIERAX, Vigors.

26. H. MELANOLEUCOS, Blyth, *J. A. S.* XII, 179 (bis).

HAB. Asám.

Remark. We have seen only one specimen of this strongly marked species, which Mr. McClelland received alive from the province named.

27. H. EUTOLMOS, Hodgson.

SYN. *H. bengalensis* apud Blyth, *J. A. S.* XII, 179 (*bis*).

Bengal Falcon, var. A, Latham.

Doung-oo-nhouk, Arakan.

HAB. Nepal, Sylhet, Arakan, Tenasserim provinces.

Remark. Edwards's figure of "the little black and orange Indian Hawk," pl. 108, upon which are founded *Falco cærulescens*, L., and *F. bengalensis*, Brisson, has never been verified by the discovery of a specimen, nor is a *Hierax* known to occur in Bengal; but we nevertheless are of opinion that a peculiar and distinct species is represented by the figure referred to, which may yet be recovered, and the more probably as several species of this genus are now known, and we are acquainted with but a single specimen of *H. melanoleucos*.

* This and the next species we have never observed wild, but certain *shikáris* take many alive with bird-lime, and we have had several newly caught specimens (procured in the immediate vicinity of Calcutta) brought in the course of a few days. They very soon become tame in captivity. The habits of both are doubtless as described in *Ann. Mag. N. H.* 1843, pp. 413, 424.

28. H. FRINGILLARIUS (*Dict. Class. d'Hist. Nat.*, pl. 21; *Pl. Col.* 97).

SYN. *Falco fringillarius*, Drapiez.
Hiërax malayensis, Strickland.
Malayan *F. cærulescens*, auctorum.
See-ap Belang, Penang; *Allap*, or *Allap Allap*, Java (Horsfield).

HAB. Tenasserim provinces, Malayan peninsula, and western Indonesia generally; replaced by other species in the more eastern islands.

Subfam. PERNINÆ.

Genus BAZA, Hodgson.

29. B. LOPHOTES (*Pl. Col.* 10).

SYN. *Falco lophotes*, Temminck.
F. et *Lepidogenys Lathami*, Gray.
Baza syama, Hodgson.
Lophotes indicus, Lesson.
Syáma ('black'), Nepal (Hodgson).

HAB. India generally; rarer to the south: Ceylon. Not uncommon in the rainy season in Lower Bengal.

30. B. REINWARDTII (Muller, *Aves*, t. 5.)

SYN. *Falco* (*Lophotes*) *Reinwardtii*, Muller.
Lophastur Jerdoni, Blyth.
Aviceda sumatrensis, Lafresnaye, *Rev. Zool. par la Soc. Cuv.* 1848, p. 210.

HAB. Malayan peninsula, rare; Sumatra; Borneo; Celebes.

Genus PERNIS, Cuvier.

31. P. CRISTATA, Cuvier (*Pl. Col.* 44; Muller, pl. 7).

SYN. *Falco ptilorhynchus*, Temminck.
Buteo cristatus, Vieillot.
P. Elliotti, Jameson.
P. maculosa, *P. torquata*, *P. ruficollis*, et *P. atrogularis*, Lesson.
P. apivora of India, auctorum.
Mádhava (from *madhu*, 'honey'), Nepal (Hodgson);
Shahatelá (from *shahad*, 'honey'), H. (Jerdon).

Hab. India generally; Malay countries: not rare in Lower Bengal.

Remark. This averages a rather larger size than the European Pern, with the beak proportionally somewhat larger; but in other respects there is a great similitude in all the many varieties of plumage, except that the Indian bird has an occipital crest more or less developed, sometimes to a length of above 2¼ in., though in many this is short or even scarcely traceable.

Subfam. ELANINÆ.

Genus Elanus, Savigny.

32. E. melanopterus (Lev., *Ois. d'Afr.*, t. 36; Gould's *B. E.*, pl. 31.)

Syn. *Falco melanopterus*, Daudin.
F. Sonninensis et *F. vociferus*, Latham.
F. clamosus, Shaw.
E. cæsius, Savigny.
Petite Buse Criarde, Sonnerat.
Kotta Falcon, and (the young) *Indian Falcon*, Latham.
Kápáshi ('cottony'), H.; *Angkal Angkal*, Java (Horsfield).

Hab. S. Asia and its archipelago; S. Europe (rare); and all Africa: common in Lower Bengal, and generally over India.

Remark. Of this genus, one strongly marked species exists in New Holland, in the *E. scriptus* figured in Gould's 'Birds of Australia.' Another of great beauty and even more strikingly distinct, in S. America, the *E. Swainsonii* (v. *Gampsonyx Swainsonii*, Vigors, et *E. torquatus*, Lesson). The other *Elani* of Asia, Africa, and America, are scarcely, even if at all, distinguishable. The diagnosis of the Prince of Canino separating the ordinary Elan of the New World from that of the Old (at least of Java), we have not found to hold good, and the same is remarked by Prof. Schlegel; but he distinguishes the African on the one hand, from the Asiatic and ordinary Australian on the other, referring that sometimes observed in the south of Europe to the former. This naturalist remarks, that "les traits distinctifs des diverses espèces de ce genre n'ont été indiqués jusqu'à présent que d'une manière assez superficielle. L'*Elanion blac*, qui visite acci-

dentalement l'Europe, quoique sa véritable patrie soit l'Afrique, se distingue constamment de l'*Elanion axillaire*, par sa queue beaucoup plus courte, et par la teinte blanche de la partie interne des ailles; du reste ces deux espèces se ressemblent assez, par rapport au système de coloration.

"L' *Elanus axillaris*, Gould, *B. Austr.*," Vol. I. pl. 23,—"*Falco axillaris*, Lath.,—*Circus axillaris*, Vieillot, *Encycl. Method.* III, p. 1212,—*Elanus notatus*, Gould, *P. Z. S.* 1837, p. 99, 141, qui habite l' Archipel des Indes et la Nouvelle Hollande, s'eloigne du précédent par sa queue plus longue ainsi que par les grandes couvertures internes des ailles qui sont *le plus souvent** d'une teinte noire. Je ne vois pas en quoi se distingue de cette espèce des Indes, celle qui habite l'Amerique, et qui a été indiquée sous les noms suivans: *Falco dispar*, Tem., *p. c.* 319 (jeune de l'année), Ch. Bonap.,—*Contin. of Wilson*, pl. XI, f. 1; Audubon, pl. 352; *Elanus leucurus*, Bonap., *list*, p. 4."

The Indian Elan has never the black patch on the under surface of the wing represented in Gould's figure of the Australian species, nor is it ever without a distinct trace of this black, in general just indicating the periphery of the marking in the Australian bird. A specimen in immature plumage from the Cape *exactly resembles* the Indian bird of the same age, in proportions as well as colouring.

Subfam. CIRCAËTINÆ.

Genus CIRCAËTUS, Vieillot.

33. C. GALLICUS (*Pl. Enl.* 413; Gould's *B. E.* pl. 13.)

SYN. *Falco gallicus*, Gmelin.
F. brachydactylus, Temminck.
F. leucopsis, Bechstein.
F. longipes, Wilson.
Accipiter hypoleucos, Pallas.
Aquila leucamphomma, Borkh.
A. pygargus, Brisson.
C. leucopsis et *C. auguium*, Brehm.
Sámp-márilo ('Snake-killer'), Beng.; *Sámp-mar* (ditto), H.; *Mulpatu*, Can. (Jerdon).

* The Italics are ours. *E. B.*

Hab. Europe, Asia, and Africa. Common on the plains of India, preferring an open country and preying chiefly on snakes.

Genus Hæmatornis, Vigors.

34. H. cheela (Gould's 'Century,' pl. 1.)

Syn. *Falco cheela*, Latham.
H. undulatus, Vigors.
Circaëtus nipalensis, Hodgson.
H. et *Buteo bacha*, apud Franklin et Sykes.
F. albidus, Cuv., et *Buteo melanotis*, Jerdon (the young).
F. bacha, Daudin (African race).
F. bido, Horsfield (Malayan race).
Tilái-báj ('spotted Hawk'), B.; *Sabchur* ('full-crested'), ditto, young; *Goomcan Mooryala*, Mahr. (Jerdon); *Doung-tswon*, Arakan (Phayre); *Bido*, Jav. (Horsfield).

Hab. India generally: very common in Lower Bengal; preferring a jungly country, interspersed with tanks and shallow lakes, where it preys much on frogs, which it clutches in the mud. Hence its feet are generally clotted with mud.

Remark. Specimens of this bird from the Malay countries, and also two that we have seen from Ceylon, are rather smaller than those of India and Burma; but we can perceive no other difference. We believe Levaillant is the only author who indicates it from Africa. The Philippine race (*H. spilopterus*, Vigors), is described to be more speckled.

Subfam. CIRCINÆ.

Genus Circus, Lacépède.

35. C. æruginosus (Gould's *B. E.* pl. 32).

Syn. *Falco æruginosus*, L.
F. rufus, Gmelin.
F. arundinaceus, Bechstein.
Accipiter circus, Pallas.
Circus palustris, Brisson.
C. variegatus, Sykes.
C. rufus, var. *indicus*,—et *C. Sykesi*, Lesson.

Konta Falcon, *Muskooroo Falcon*, and *Rufous-eared Falcon*, Latham.

Chóá or *Mát Chil* ('Meadow kité), Beng. (generic): *Kutar*, and *Kulehsir* ('capped'), Hind.: *Sufed Sira* ('white-headed'), and *Tiki Bauri* (Hawk with the *tika* frontal mark), *ibid.* (B. Ham.)

Hab. Europe, Asia, and Africa: common in India.

Remark. The adult males of this bird in India have yellow irides, and the wings and tail ash-grey. This phase we have never seen in Europe; though represented (from an Indian specimen however) in Gould's 'Birds of Europe.'

36. Circus cyaneus (Gould's *B. E.* pl. 33.)

Syn. *F. cyaneus*, *F. pygargus*, et *F. hudsonius*, L.

F. bohemicus, *F. albicans*, *F. griseus*, *F. montanus*, *F. uliginosus*, *F. albidus*, *F. variegatus*, et *F. Buffonii*, Gmelin.

F. cinereus, et *F. rubiginosus*, *It. Poseg.* p. 29.

F. europygistus, Bosc, Daudin.

F. strigiceps et *Circus gallinarius*, Daudin.

Pygargus dispar, Koch.

Tapús, or *Músh-khor* ('Rat-eater'), of Kabul (Burnes).

Hab. Europe, N. Africa, N. and Middle Asia; sub-Himalayan territories.

Remark. The American race, *C. uliginosus*, (Gmelin), according to Dr. Schlegel, "se distingue, dans tous les âges, du Busard St. Martin" *(C. cyaneus)* "d'Europe, par des tarses plus élevés. Le vieux mâle a ordinairement toutes les parties inférieures, à partir de la poitrine, ornées des taches nombreuses, soit orbiculaires, soit transversales, d'un brun ferrugineux." Sir W. Jardine, however, could not distinguish some Bermuda specimens from *C. cyaneus* of Europe. Vide *Contrib. Orn.* Neither does Mr. G. R. Gray regard the N. American Harrier as distinct from *C. cyaneus* in his last British Museum Catalogue of *Raptores* (1848).

37. C. Swainsonii, A. Smith. (Gould's *B. E*, pl. 34).

Syn. *C. pallidus*, Sykes.

C. dalmaticus, Ruppell.

C. albescens, Lesson.
Falco æquipar, Cuvier, *M.S.*
Falco cyaneus, var. A., Lesson.
F. herbæcola (?), Tickell.
Dast-Mal ('Hand-soiler'), H.; *Tiä* (from the voice), Derajat (Burnes); *Pandouvi* (Buch. Ham.)

Hab. S. E. Europe, Asia, and Africa: common in India.

Remark. This species is regarded by Dr. Schlegel as merely a local variety of the next; but the two are about equally common in most parts of India in the same localities, and a practised eye distinguishes them readily in any state of plumage. In Lower Bengal, we have found *C. cinerascens* to be the more abundant.

38. C. CINERASCENS (Gould's *B. E.* pl. 35).

Syn. *Falco cinerascens* et *cineraceus*, Montagu.
C. Montagui, Vieillot.

Hab. Europe, Asia, and Africa; all India; Ceylon. Common.

39. C. MELANOLEUCOS (Pennant's *Indian Zoology*, pl. 2.)

Syn. *Falco melanoleucos*, Pennant.
Pahatûi, H.; *Ablak Petaha* ('Pied Harrier'), *Petaha*, &c. (probably from the voice), Hind.; *Thin-kya*, Arakan (Phayre).

Hab. India generally, Ceylon, Arakan, Tenasserim provinces.

Remark. The sexes of this bird are alike, and we have never seen the young, or examples in any state of plumage but the fully adult; although this species is common in Lower Bengal.

Subfam. ACCIPITRINÆ.

Genus ACCIPITER, Ray.

40. A. NISUS, Pallas (*Pl. Enl.* 467, 412; Gould's *B. E.* pl. 18).

Syn. *Falco nisus*, L.
F. lacteus, Gmelin.
F. nisosimilis, Tickell, *J. A. S.* II, 571.
A. fringillarius, Ray.
A. Dussumieri apud Jerdon, *Madr. Journ.* X, 84.
Nisus communis, Cuvier.

N. elegans, N. fringillarum, et *N. peregrinus*, Brehm.
Bassun Falcon, Latham.
Báshá,* female; *Báshin*, male; H.

Hab. Europe, Asia, and N. Africa: in India numerous in the hilly parts, rare and accidental on the alluvium of Lower Bengal. *N. B.* We have not seen this species from the eastern side of the Bay of Bengal. It is, however, an inhabitant of Japan.

Remark. The common Sparrow-hawk of N. America, *Acc. fuscus*, (Gm.), v. *F. velox* et *pennsylvanicus*, Wilson, according to Dr. Schlegel, appears to differ only from that of Europe in being rather less robust, and in the markings on the under-parts of the young assuming the form of tears; and the corresponding species of S. Africa (extending to the N. E. of that continent), *Acc. rufiventris*, A. Smith, v. *F. exilis*, Tem., *p. c.* 496, et *F. perspicillaris*, Ruppell, according to the same naturalist, seems to differ only from that of Europe in the lower parts of the adult being of a reddish-ferruginous, with the markings a little deeper-coloured and somewhat indistinct.

41. A. NISOIDES, Blyth, *J. A. S.* XVI. 727.

Syn. ? Sumatran *Acc. fringillarius* of the Appendix to Lady Raffles's Memoir of Sir Stamford Raffles, p. 549.
Shikap Ballam (*?*), Sum. (Raffles).

Hab. Malayan peninsula; Sumatra?

Remark. Mr. G. R. Gray is mistaken in referring this as a synonyme of *Acc. virgatus*, if the latter be truly the Indian *Bázra*, as he arranges it. We rather suspect that the present species is the true *virgatus* of the Malay countries.

42. A. VIRGATUS? (Tem. *Pl. Col.* 109, male; Jerdon's *Ill. Ind. Zool.* pl. 4, 29).

Syn. *Falco virgatus*, Temminck, apud G. R. Gray.
A. besra, Jerdon; and the female,
A. fringillarius apud Jerdon, *Catal.*
A. Dussumieri apud Sykes.
Nisus (nec *Sparvius*) *minutus* (*?*) Lesson.†

* The name *Basha* is however *masculine*.

† Referred by Dr. Pucheran to "*Nisus soloënsis*" in the *Rev. Zool. par la Soc. Cuv.* 1850, p. 210; a species assigned by him to Sumatra on the authority of Duvaucel, and to the *Coromandel Coast* and *Ceylon* on that of Leschenault, which

F. minutus (*?*), L.

F. Brissonianus (*?*), Shaw.

Bázra (diminutive of *Báz*, 'Goshawk'), and the male, *Dharti* (a 'handful,' or held in the hand), H.; *Vaishtapa Dyaga*, Telugu (Jerdon); *Ur chilli*, *Tamul*, Halapyk caste (Jerdon).

Hab. India generally, but chiefly the hilly parts; also the Malay countries: rare and accidental in Lower Bengal.

Genus Micronisus, G. R. Gray.

43. M. badius (Tem. *Pl. Col.* 308, 336).

Syn. *Falco badius*, Gmelin.

F. Brownii, Shaw.

F. Dussumieri, Tem. (nec apud Sykes's or Jerdon's Catalogues).

Accipiter dukhunensis, Sykes.

Nisus malayensis, Meyer.

Calcutta Sparrow-hawk and *Chippuck Falcon*, Latham.

Shikrá (from *Shikárkardan*, to pursue game), female; *Chippak* (or *Chipká*, Jerdon, from the voice), male, H.; *Thin-kyet*, Arakan (Phayre).

Hab. India generally, Burmese and Malay countries; being very numerous throughout India and in Ceylon: not uncommon in Afghanistan.

Genus Astur, Bechstein.

44. A. palumbarius (*Pl. Enl.* 418, 423, 461; Gould's *B. E.* pl. 17).

Syn. *Falco palumbarius* et *F. gentilis*, L.

F. gallinarius, Gmelin.

F. albescens, Boddaërt.

Accipiter astur, Pallas.

Astur gallinarum, Brehm.

Báz or *Báz-Khání*, female; *Júrrá*, male; H. (*N. B.* The *Karangosh* is probably a variety.)

Hab. Europe and Asia, rare in N. Africa: in India confined, or nearly so, to the Sub-Himalayas.

leads us to suspect that our No. 42 is intended. As Mr. G. R. Gray classes *F. soloënsis*, Horsf. (v. *F. cuculoides*, Tem.), in *Micronisus*, it cannot well be our No. 41, as formerly suspected.

Remark. The N. American Goshawk, *A. atricapillus*, (Wilson), v. *F. regalis*, Tem. (*Pl. Col.* 495), is regarded by Audubon and lately by Mr. G. R. Gray as identical with the European; but M. M. Temminck and Schlegel consider them distinct, and Sir W. Jardine thus points out the differences observed by him. "The greatest difference," he writes, "between the two birds is in the marking of the breast and under-parts, and is so distinct as to be at once perceived. In the American species, the under-parts are of a uniform pale greyish-white, having the tip and centre of each feather black, forming a dark streak. This extends to those in the centre of the belly, after which it is hardly visible; every feather in addition is clouded with irregular bars of grey. In the European bird, the markings are in the shape of two decided transverse bars on each feather, with the shaft dark, but not exceeding its own breadth,—each, as a whole, having a very different appearance. The upper parts of the American bird are also of a blue shade, and the markings of the head and auriculars are more decided. Wilson's figure is a most correct representation." Dr. Schlegel remarks, that a third closely affined species inhabits Japan.

45. A. TRIVIRGATUS (*Pl. Col.* 303).

SYN. *Falco trivirgatus*, Reinwardt.
Astur indicus, Hodgson.
A. palumbarius apud Jerdon, *Catal.*
A. cristatus, G. R. Gray.
Spizaëtus rufitinctus, McClelland, *P. Z. S.* 1839, p. 153.
Gar ('fort' or 'mountain') *Bázrá, Mánik* ('esteemed') *Bázrá, Koteswar* ('fort-chieftain'), H.; *Churiáli* (frequenting peaks) Nepal.*

HAB. India, Burma, and Malay countries; being confined to the hilly parts.

Subfam. THRASAËTINÆ.

Genus SPIZAËTUS, Vieillot.

46. SP. NIPALENSIS.

SYN. *Nisaëtus nipalensis*, crested variety, Hodgson, *J. A. S.* V, 229.
N. pulcher, ibid., *J. A. S.* XII, 305.

* There is a great similitude of plumage in the species numbered 42 and 45.

Falco orientalis (*?*), et *F. lanceolatus* (*?*), Temminck and Schlegel.

HAB. Himalaya, and mountain ranges north of Sylhet: also mountains of Ceylon, and probably therefore those of S. India.

47. SP. CIRRATUS? (Horsf. *Zool. Res. in Java*, pl.).

SYN. *Falco cirratus (?)*, Gmelin.
F. cristatellus, Temminck.
F. Lathami, Tickell.
Nisaëtus pallidus, Hodgson, young.
Falco limnaëtus, Horsfield.
F. caligatus, Raffles.
F. niveus, Temminck.
Limnaëtus Horsfieldi, Vigors.
Nisaëtus nipalensis, crestless var., Hodgson, *J. A. S.* V, 229.
Lake Falcon, *Bauj Eagle*, and probably *Jerwied Eagle*, Latham.
} var.
Sháh-báz or *báj* ('Regal Goshawk'), and *Sadal*, Hind.; *Lang Tanjbikar*, Sum. (Raffles); *Wura Rawa*, Jav. (Horsfield).

HAB. In two varieties, India generally, Burma, and Indonesia.

Remark. The very common race of Lower Bengal (distinguished above as a variety), occurring also in the Malay countries, and in the sub-Himalayan region, or at least its S. E. portions, has very rarely a developed occipital crest, but in general a mere indication of one, though in one specimen we have seen it 3 inches long. This race also becomes wholly of a sooty-black with age,* save on the base of the remiges underneath, and the tail underneath except towards its tip. The other race, diffused from the sub-Himalayas all over Hindustan, S. India, and Ceylon, has constantly (so far as we have seen) a well developed occipital crest, sometimes attaining to 5½ in. long, and does not appear ever to assume the wholly black plumage, the young also differing in colour from the young of the preceding variety. Nevertheless, after extensive comparison of specimens, we cannot venture to recognise

* Analogous to *Archibuteo lagopus* and *A. sancti Johannis*, though rarely so in the former of these two species (if different, as M. Schlegel contends); also to *Astur melanoleucos* of S. Africa.

these races as specifically distinct. We are unaware that this bird ever exhibits a lengthened crest in the Malay countries.

48. Sp. ALBONIGER.

Syn. *Nisaëtus alboniger*, Blyth, *J. A. S.* XIV, 173.

Hab. Malayan peninsula (Penang, Malacca).

Remark. Mr. G. R. Gray places this as a variety of the preceding species, to which we cannot give our assent; unless indeed it be considered as a third and very strongly marked Malayan variety, found together with the Bengal variety, and representing the crested race of peninsular India. It is more probably a distinct species, though undoubtedly very closely affined to the preceding one.

*49. Sp. KIENERI.

Syn. *Astur Kieneri*, de Sparre.

Spizaëtus albogularis, Tickell, Blyth, *J. A. S.* XI, 456.

Hab. Himalaya; C. India.

Subfam. AQUILINÆ.

Genus EUTOLMAËTUS, Blyth.

50. Eu. BONELLII (*Pl. Col.* 288; Gould's *B. E.* pl. 7; Jerdon's *Ill. Ind. Orn.*, pl. 1).

Syn. *Falco Bonellii*, Temminck.

F. ducalis, Lichtenstein.

Aquila intermedia, Bonelli.

Aq. bifasciata, Vieillot, *Enc. Method.* p. 1192 (apud G. R. Gray).

Nisaëtus grandis, Hodgson, *J. A. S.* V, 230.

N. niveus apud Jerdon, *Catal.*

Genoëse Eagle, Latham.

Moranga, or *Morangi* ('Slayer of Pea-fowl'), Hind.; *Talwa*, Telugu; *Rajali*, Tamul (Jerdon).

Hab. S. of Europe and Asia; N. Africa: replaced in S. Africa by the affined *Eu. bellicosus*, (Daudin), v. *Falco armiger*, Shaw. In India and Ceylon, confined to the hilly parts, where far from rare.

Genus AQUILA, Meyer.

*51. Aq. CHRYSAËTOS (*Pl. Enl.* 409, 410, Gould's *B. E.* pl. 6).

Syn. *Falco chrysaëtos*, *F. fulvus*, *F. melanäetos*, et *F. canadensis*, L.

F. niger, et *F. americanus*, Gmelin.

F. melanonotus, Latham.

F. regalis, Temminck *Man. d'Orn.* (1815), p. 10 (nec *Pl. Col.* 495), apud G. R. Gray.

Aquila nobilis, Pallas.

Aq. regia, Lesson.

Aq. melanäetus, Brehm.

Dapheni, E. Himalaya (Hodgson).

HAB. Mountainous regions of the northern temperate zone, including the Himalaya.

52. AQ. MOGILNIK (Sav. *Descr. de l' Egypte, Hist. Nat.* I, t. 12; Gould's *B. E.* pl. 5).

SYN. *Falco mogilnik*, Gmelin.

F. ferox, and *Brown-backed Eagle*, Latham.

F. imperialis, Temminck.

Aquila heliaca, Savigny.

Aq. bifasciata, Gray.

Aq. nipalensis, Hodgson, *As. Res.* XVIII, pt. II, 13, pl. 1.

Aq. chrysaëtos apud Meyer, et Jerdon, *Catal.*

Jumiz, or *Jumbiz*, H.; *Frés*, Beng.; *Won-lo*, Arakan.

HAB. Hill regions of S. E. Europe, Asia, and N. Africa.

53. AQ. NÆVIOIDES (Hardwicke, *Ill. Ind. Zool.*)

SYN. *Falco nævioides*, et *F. senegallus*, Cuvier.

F. rapax, Temminck.

F. obsoletus, Lichtenstein (nec Gmelin).

F. choka, A. Smith.

F. albicans, Ruppell.

Aq. fulvescens, *Aq. fulva*, et *Aq. punctata*, Gray.

Aq. vindhiana, Franklin.

Aq. imperialis apud Lesson, Traitè, p. 97.

Wokháb, also *Jimach* (vide *J. A. S.* XV, 8), H.

HAB. Plains chiefly of India and Africa generally; but not found on the alluvium of Lower Bengal. This small Eagle is remarkable for its habit of preying on the true Falcons!

54. AQ. NÆVIA (Savigny, *Descr. de l' Egypte, Hist. Nat., Ois.*, t. 1, et t. 2, f. 1; Gould's *B. E.*, pl. 8).

SYN. *Falco nævius*, *F. maculatus*, et *F. undulatus*, Gmelin.

Aq. melanaëtos, Savigny.

Aq. clanga, Pallas.
Aq. bifasciata, Hornsch.
Aq. pomarina, Brehm.
Aq. planga et *Spizaëtus fuscus*, Vieillot.
Spotted Eagle, and *Brown-backed Eagle*, var. A, Latham.
Káljanga, *Bakayári*, *Jiyadha* (B. Ham.)

Hab. East of Europe, Asia, and N. Africa. Common in the Bengal Sundarbans, and found likewise in Central and S. India.

55. Aq. hastata.

Syn. *Morphnus hastatus*, Lesson.
Spizaëtus punctatus, Jerdon.
Limnaëtus unicolor apud Blyth, *J. A. S.* XII, 128.
Jiyadha, and *Guti-már* ('cocoon-destroyer'), H.

Hab. Common in the Bengal Sundarbuns, and found likewise in Upper Bengal, aud in Central and S. India.

Remark. This and the preceding three species vary greatly in plumage. No. 53 is in structure a miniature of No. 52; No. 54 is larger than No. 53, but less robust; and the present species, with about the same linear dimensions as No. 54, is again of more feeble conformation. A practised eye readily distinguishes either in any phase of colouring.

Genus Ictinaëtus, Jerdon (nec Kaup).

56. I. malaïensis (Tem. *Pl. Col.* 117).

Syn. *Falco malaïensis*, Reinwardt.
Aquila et *Heteropus* et *Neopus perniger*, Hodgson.
Nisaëtus? ? ovivorus, Jerdon.
Black Eagle, Jerdon, *Catal.*, and *Supp.*

Hab. S. E. Himalaya; Nilgíris; Malay countries.

Genus Hieraëtus, Kaup.

57. H. pennatus (Tem. *Pl. Col.* 33; Gould's *B. E.* pl. 9).

Syn. *Falco pennatus*, Gmelin.
F. lagopus, Bengal variety, Latham.
Aquila minuta, Brehm.
Spizaëtus milvoides, Jerdon.
Butaquila strophiata, Hodgson (vide *Calc. Journ. N. H.* VIII, 95).

Hab. E. Europe, Asia, Africa; India generally; Ceylon.

Remark. Prof. Schlegel mentions this bird as of very rare occurrence in Europe and Africa, and that he did not know its proper habitat. It appears to be far from rare throughout India; and the Society's Museum contains a fine series of specimens from the vicinity of Calcutta.

Genus ARCHIBUTEO, Brehm.

58. A. HEMIPTILOPUS, Blyth, *J. A. S.* XV, 1.

SYN. *A. cryptogenys*, Hodgson, *Calc. Journ. Nat. Hist.* VIII, 89, and pl. 5, f. 1.

HAB. Sikim; Tibet.

Genus BUTEO, Cuvier.

59. B. AQUILINUS, Hodgson, Blyth, *J. A. S.* XIV, 176 (March, 1845).

SYN. *B. leucocephalus*, Hodgson, *P. Z. S.* 1845, p. 37 (April).
Falco asiaticus (*?*), Latham, *Index. Orn.* p. 14.
F. hemilasius (*?*), Temminck and Schlegel.
B. strophiatus, Hodgson, apud Kaup and G. R. Gray.

HAB. Nepal (G. R. Gray); Tibet; China? Japan?

60. *B. PLUMIPES*, Hodgson, *P. Z. S.* 1845, p. 37.

SYN. *Circus plumipes*, Hodgson, *Beng. Sp. Mag.* 1836, p. 182; *J. A. S.* XV, 2.

HAB. Nepal; Tibet.

61. B. RUFINUS (Ruppell, *Zool. Atlas*, t. 27).

SYN. *Circus rufinus*, Ruppell (apud G. R. Gray).
C. et *Buteo pectoralis*, Vieillot, var.?
B. canescens, Hodgson.
B. longipes, Jerdon.
Nasal Falcon, Latham.
Chuhá Már ('Rat-killer'), H.

HAB. India generally; plains and lower hills. In Lower Bengal, found only above the tideway of the river: also N. Africa.

62. B. VULGARIS, Bechstein (Jerdon's *Ill. Ind. Orn.* pl. 27).

SYN. *Falco buteo*, L.
F. glaucopis, Merrem.
F. variegatus, versicolor, cinereus, et *obsoletus*, Gmelin.

F. pojana, Savi.
B. albus, Daudin.
B. mutans et *fasciatus*, Vieillot.
B. septentrionalis, *medius*, et *murum*, Brehm.
B. communis, Cuvier.
B. Swainsonii, Pr. Bonap.
B. montanus, Ruppell.
B. rufiventer, Jerdon.

Hab. Northern hemisphere; rare and to the northward only in America. The loftier hills only in India.

Remark. We doubt if this can in all cases be satisfactorily distinguished from the preceding species, and certainly not some European specimens from some Himalayan or Nilgiri examples.

63. B. pygmæus, Blyth, *J. A. S.* XIV, 177.

Syn. ? *Astur barbatus*, Eyton, from Malacca (referred by Mr. G. R. Gray to the Japanese *Falco* or *Poliornis pyrrhogenys*, Temminck and Schlegel).

Hab. Tenasserim provinces; Malayan peninsula?

Remark. This is a true long-winged *Buteo*, though resembling *Poliornis* in some respects; and Mr. Eyton's description sufficiently well applies to it, allowing for some variation of plumage from the Society's specimen. The admeasurements in particular correspond.

Genus Poliornis, Kaup.

64. P. teesa (Hardwicke's *Ill. Ind. Zool*).

Syn. *Circus teesa*, Franklin.
Astur hyder, Sykes.
Zuggun Falcon, Latham.
P. fasciatus (?), A. Hay, *Madr. Journ.* XIII, 146.
Tisa (or *Teesa*, from the voice), H.

Hab. Plains of India, where very abundant: never met with on the mud-soil of Lower Bengal, though appearing immediately this is quitted in a westerly direction: Tenasserim provinces; Malayan peninsula?

Remark. Specimens from Tenasserim and from S. India having large whitish supercilia appear to agree with Lord A. Hay's description of his *P. fasciatus* from Malacca; and the *Astur barbatus*, Eyton, from Malacca, referred to the Japanese *P. (?) pyrrhogenys* by Mr.

G. R. Gray, we have already dubiously assigned to No. 63. The present genus, on mature consideration, we have placed next to *Buteo*, the lengthened cere separating it from the ACCIPITRINÆ among which it is included by Mr. G. R. Gray and others, following Col. Sykes. Major Franklin referred it to *Circus*, and Prof. Kaup regards it as subordinate to *Circäetus*.

Subfam. HALIAËTINÆ.

Genus PANDION, Savigny.

65. P. HALIAËTUS (Gould's *B. E.* pl. 12).

SYN. *Falco haliaëtus*, L.
F. carolinensis, *F. cayanensis*, et *F. arundinaceus*, Gmelin.
F. piscator, Brisson.
Aquila piscatrix, Vieillot.
Aq. balbuzardus, Dumeril.
P. fluvialis, Savigny.
P. americanus, Vieillot.
P. alticeps et *P. planiceps*, Brehm.
P. indicus, Hodgson.
P. icthyäetus, Kaup (apud G. R. Gray).
Bengal Osprey, Latham.
Mátch-Moṛol ('Fish Tyrant'), and *Bulla*, B.; *Mucherera*, H. (Jerdon); also *Mátch-mángá*, H.: *Won-let*, Arakan (Phayre).

HAB. Of general distribution; the Australian race (*P. leucocephalus*, Gould, which according to M. Schlegel is found also in Japan and in the eastern Archipelago), alone slightly differing. Common throughout India, in all suitable localities.

Remark. The Osprey is a very peculiar form among the *Falconidæ*, and wants the projecting super-orbital bone which is so characteristic of (we believe) all the rest. The next genus approximates *Pandion* in the adaptation of structure for piscivorous habits, but is nevertheless very distinct, and much more nearly affined to true *Haliäetus*.

Genus PONTOAËTUS, Kaup.

66. P. ICTHYAËTUS (Horsf., *Zool. Res. in Java*, pl.).

SYN. *Falco icthyaëtus*, Horsfield.
Haliaëtus plumbeus, Hodgson.

Icthyaëtus bicolor, G. R. Gray.

Pandion lineatus (?), Jerdon, young.

Mátch-moṛol ('Fish Tyrant'), Beng.; *Madhuya*, H. (B. Ham.); *Jokomaru*, Java (Horsfield).

Hab. India and Malay countries: common in Lower Bengal.

67. P. humilis (Tem. and Müller, *Ois.* t. 6).

Syn. *Falco (Pandion) humilis*, Müller.

Icthyaëtus nanus, Blyth, *J. A. S.* XI, 202, et XII, 304.

Hab. Malayan peninsula; Sumatra.

Genus Blagrus, Blyth.

68. B. leucogaster (*Pl. Col.* 49; Gould's *B. Austr.* Vol. I, pl. 3).

Syn. *Falco leucogaster*, Gmelin.

F. blagrus, Daudin.

F. dimidiatus, Raffles.

F. albicilla, var., Latham.

Icthyaëtus cultrunguis, Blyth, the semi-adult.

Haliaëtus sphenurus, Gould, the young.

Kampi-mar Eagle, the semi-adult; and *Maritime Eagle*, the adult; Latham.

Tampa-már ('Snake-killer'), Orissa; *Kohásá*, H. (Jerdon); *Langlaut*, Sum. (Raffles).

Hab. India; Africa (?); the Malay countries; and Australia. Tolerably common in Lower Bengal.

Genus Haliae'tus, Savigny.

69. H. Macei (Tem. *Pl. Col.* 8).

Syn. *Falco Macii*, Temminck.

H. albicilla apud Vigors and Horsfield?

H. ossifragus (?) apud Raffles.

H. fulvigaster, Vieillot.

H. albipes, Hodgson.

H. unicolor, Gray, the young (Hardw. *Ill. Ind. Zool.*)

Mátchéráng, *Mátch-manggar*, *Koṛol*, or *Mátch-koṛol* ('Fish Eagle'), and *Bala*, Beng.; *Kokna*, or *Oogoos* (Tickell); *Lang-laut?* (Sum.) Raffles.

Hab. Northern India generally; abundant in Lower Bengal; Malay countries?

Genus HALIASTUR, Selby.

70. H. INDUS (*Pl. Enl.* 416).

SYN. *Falco indus*, Boddaërt.
F. ponticerianus, Gmelin.
Haliaëtus girrenara, Vieillot.
H. garruda, Lesson.
Milvus rotundicaudatus, Hodgson, young.
Shankar Chil ('Shiva's kite), *Dhobia Chil* ('Washerman's Kite'), and *Ruh-mubárik* ('lucky-faced,' i. e. propitious), Hind.; *Khemañkari*, Sanskrita; *Rutta Ookab*, Sindh (Burnes), also *Pilyo; Tswongoung phyoo*, Arakan (Phayre); *Lang bondal*, Sum. (Raffles); *Ulang*, Java (Horsfield).

HAB. India and Malay countries; extremely common; replaced by a nearly affined species in Australia.

Genus MILVUS, Cuvier.

71. M. GOVINDA, Sykes.

SYN. *M. cheele*, Jerdon.
M. melanotis, Temminck.
Haliaëtus lineatus (?), Gray, Hard. *Ill. Ind. Zool.*
Chil (from the voice), or *Pariah Chil*, H.; *Tswonbop*, Arakan (Phayre).

HAB. S. E. Asia and its islands; extremely common. In Lower Bengal it disappears during the rainy season.

Remark. The dark-plumaged Kites (*Hydroictinia*, Kaup,) are widely diffused over the Old World and Australia, and among them the African, *M. ægyptius*, (*Falco ægyptius* et *F. Forskalli*, Gm., and *F. parasitus*, Daudin,) is well characterized by its yellow beak and some other differences; but we are not aware in what the Australian (*M. affinis*, Gould), and that of Europe and "temperate Asia" (Schlegel,—*M. niger*, Brisson), differ from that so abundant over all S. E. Asia. Mr. Strickland refers the Indian bird to *M. niger* (of which the synonymes cited by Mr. G. R. Gray are *F. ater*, Gmelin, *F. migrans*, Boddaert, *F. fusco-ater*, Meyer, *F. cinereo-ferrugineus*, Forster, *Accipiter milvus*, Pallas, and *M. fuscus*, Brehm.) We have provisionally followed Mr. Gray and Prof. Kaup in regarding the Indian Kite as distinct from *M. niger*, but greatly suspect that the separation will be found premature, when more extensive series of specimens from the two regions shall have been carefully compared.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL

FOR APRIL, 1850.

The usual monthly meeting of the Asiatic Society was held at the Museum, on Wednesday, the 3rd April, at half past 8 P. M.

The Hon'ble Sir J. W. COLVILE, President, in the chair.

The Proceedings of the former meeting having been read and confirmed, the Secretary stated that Dr. J. McClelland and Capt. Bazeley had intimated their wish to withdraw from the Society.

The following gentlemen, having been regularly proposed and seconded at the March meeting, were balloted for and elected ordinary members of the Society :—

A. J. M. Mills, Esq., B. C. S.

D. T. Morton, Esq., Madras, M. S.

Hon'ble Capt. R. B. Byng.

C. T. Watkins, Esq.

Rev. W. Kay, Bishop's College.

Read letters—

From H. V. Bailey, Esq., Offg. Under Secretary to the Government of Bengal, presenting for the use of the Museum of Economic Geology, a geological Map of the Monghyr district.

From J. Thornton, Esq., Secretary to the Government of the North Western Provinces, forwarding copy of a letter from Lieut. R. Strachey, Bengal Engineers, informing the Society and the public of the nature and extent of his late scientific researches in Kumaoon. (Published in the Journal No. I. of 1850).

From F. J. Mouat, Esq., Secretary to the Sub-Committee of Machinery of the General Committee of Industry and Arts, requesting information regarding Miss Tytler's Models.

From Sir Henry Elliot, forwarding a Notice of the 4th volume of Tabary's History, by Dr. A. Sprenger. (Published in the last No. of the Journal).

From James Hume, Esq., Honorary Secretary of the Agri-Horticultural Society of India, transferring some samples of ore forwarded by Capt. J. C. Brooke, Commandant of the Mewar Bheel Corps, from a place called Jáwar, lying midway between Kherwárá and Udypur, together with a note from Dr. Dodd, Assay Master, who states the metal obtained from the ore to be zinc.

From Capt. Newbold, enclosing a paper by Hekekeyan Bey, on the Lead mines of Kohil et Terifel in Egypt.

From Major Wylie, Officiating Secretary to the Government of India, Military Department, transmitting three sheets of the Indian Atlas, received from the Hon'ble Court of Directors.

From Capt. Thomas Hutton, respecting certain Zoological specimens stated to be his property, and which he desires to be kept in deposit for him.

From Dr. E. Roer, Secretary to the Oriental Section, recommending on the part of the Section, the gradual publication of certain Oriental works in the Bibliotheca Indica. Referred to the Section for further consideration.

From Mr. H. Piddington, apologizing for his absence on account of illness, and forwarding an examination of a new Mineral, CALDERITE.

The Librarian having submitted his report, the meeting adjourned.

Read and approved at the meeting of the 1st May, 1850.

WELBY JACKSON, *Vice-President.*

RÁJENDRALÁL MITTRA, *Assistant Secy.*

LIBRARY.

The following books have been received since the last meeting.

PRESENTED.

Tazkerat-ul-kámelín, or Biography of eminent persons. By Rámachandra. Delhi, 1849. 8vo. (Lithograph).—PRESENTED BY SIR HENRY M. ELLIOT, KT.

Masbáh-ut-tálabín or an Index to the Historians of Mahomedan India. Simlah 1849. 12mo. (Lithograph).—BY THE SAME.

Miftáh-ut-tawárikh, or the Key to History, being a Collection of the most valuable Chronograms in the Persian language. Edited by J. W. Beale. Agra 1849. 4to.—BY THE SAME.

Nouvelles Recherches sur l'Apparition et la Dispersion des Bohémiens en Europe, par Paul Battaillord. Paris, 1849. 8vo. (Pamphlet).—By the Author.

Harivañsa, ou Histoire de la famille de Hari, traduit sur la original Sanskrit, par M. A. Langlois. 2nd Livraison. Paris, 1836. 4to.—By Rev. J. Wenger.

Journal of the Indian Archepelago. Vol. IV. No. II.—By the Editor.

Two copies of the same.—By the Government of Bengal.

Upadeshaka, No. 40.—By the Editor.

The Calcutta Christian Observer, for April 1850.—By the Editors.

The Oriental Baptist, No 40.—By the Editor.

Trignometrical Survey Maps, Nos. 69, 70, 89.—By the Govt. of India.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of February 1850.—By the Deputy Surveyor General.

Amherst as a Sanatarium. By E. Ryley, Esq. Calcutta, 1850, (Pamphlet). —By the Author.

Tattwabodhiní Patriká, No. 75.—By the Tattwabodhini' Sabha'.

Exchanged.

Journal of the Agricultural and Horticultural Society of India. Vol. VII. Part I.

Purchased.

The Edinburgh Review. No. 183.

The North British Review. No. 23.

Journal des Savánts. For Nov. 1849.

Comptes Rendus. Nos. 19 @ 24.

For May, 1850.

The usual monthly meeting of the Asiatic Society was held on the 1st of May, 1850.

Welby Jackson, Esq., Vice-President, in the chair.

The proceedings of the last meeting were read and confirmed.

Communications were read—

From C. W. Montrou, Esq., Superintendent of the Observatory at Colaba, forwarding a copy of the Magnetical and Meteorological Observations made at that Observatory during the year 1846.

From H. V. Bailey, Esq., Officiating Under Secretary to the Government of Bengal, enclosing copy of a letter addressed to the Military Board, respecting the repairs of the Adinah Masjid.

From C. Gubbins, Esq., C. S., transmitting 12 old copper coins, found in the district of Meerut.

From the Librarian, Bábu Rájendralál Mittra, submitting the subjoined note respecting the coins presented by Mr. Gubbins.

The analogoes of these coins have been figured by Mr. Thomas, in his Patan Coins of India, figs. 167-8, with which the present specimens agree in rudeness of execution, and in their general appearance. They belong to the period of Sekundar Shah Behlol, who succeeded to the throne of Delhi on the death of his father Behloli Lodi, in 894 A. H., A. C. 1488. The die with which they have been struck having been larger than the coins themselves, it is difficult to decypher the legend, but the comparison of several specimens leaves no doubt on the subject. The coins are of different mintage and dates, and vary in weight from 142 to 148 grains—a difference easily accountable in copper coins nearly four hundred years old. On the obverse, in Mr. Thomas's specimens, the phrase بحضرت دهلي follows the word سلطان, but no trace of it can be found on the specimens under examination.

Obverse.

المتوكل الرحمن سكندر شاه بهلول شاه سلطان (date) ٩٠٣, ٩١٥, ٩١٦, ٩١٧

٩١٨, (or) ٩١٩

Reverse.

في زمن اميرالمومنين خلدت خلافته

From Dr. E. Roer, Secretary to the Oriental Section, recommending on the part of the Section, that an English translation of the Ch'handogya Upanishad submitted by Bábu Rájendralál Mittra, be printed in the Bibliotheca Indica.

The Oriental Section having neglected to record their opinion on the subject, *ordered*—that it be referred to the Section for their opinion.

A copy of Dr. Hooker's Rhododendrons of Sikkim-Himálaya was presented by the Hon'ble the President, on behalf of the author, for which the thanks of the Society were voted.

Read a letter from Dr. O'Shaughnessy, dated the 15th of April, sending his resignation of the office of Secretary to the Society.

To the Hon'ble Sir James Colvile.

President to the Asiatic Society.

Hon'ble Sir,—Additional duties having devolved upon me in the Mint, and a trial Electric Telegraph having been ordered—the Construction of which

I have to Superintend; it becomes impracticable for me to continue in charge of the Office of Secretary to the Asiatic Society.

I have therefore to request that you will communicate my resignation to the Council and the Society at large.

In the interval between this and the next meeting I will make every arrangement for clearing off any arrears of business and correspondence, so as to facilitate the duties of my successor, to whom it will afford me great pleasure to give every assistance in my power on his taking charge of the Office.

I have the honor to remain,
Your obedient servant,
W. B. O'Shaughnessy, *V. P. and Secy. As. Soc.*

Calcutta Mint, 15th April, 1850.

It was unanimously resolved, that this meeting, while it receives with regret the resignation of Dr. O'Shaughnessy, desires to express its grateful sense of the valuable services which, as senior Secretary, he has so long rendered to the Asiatic Society of Bengal; and that the Secretary communicate the sentiments of the Society as above expressed to the late Secretary; and that it be published in the Journal.

Read a report of the Council of the Society, recommending the appointment of Capt. F. C. C. Hayes to succeed Dr. O'Shaughnessy as Secretary: the report is as follows:

At a meeting of the Council held on the 19th of April, 1850.

Present.

The Hon'ble Sir James Colvile, *President.*
W. B. Jackson, Esq. *Vice-President.*
W. Seton Karr, Esq.
S. G. T. Heatly, Esq.
R. W. G. Frith, Esq. } *Members.*
Bábu Ramgopal Ghose.
C. Beadon, Esq.

The President stated that since the circulation of Dr. O'Shaughnessy's letter of the 15th of April, 1850, he had ascertained that Capt. Fletcher Hayes was willing to be put in nomination for the office of Secretary. Wherefore it was resolved unanimously

That Capt. Fletcher Hayes be proposed by the Council to the next general meeting of the Society for election as Joint Secretary of the Asiatic Society of Bengal in the room of W. B. O'Shaughnessy, Esq., M. D., resigned.

The meeting unanimously approved of the nomination of the Council.

Confirmed, 3rd June, 1850, J. W. Colvile, *President.*
Fletcher Hayes, *Secretary.*

Library.

The following books have been received since the last meeting.

Presented.

The Rhododendrons of Sikkim-Himálaya, being an account, Botanical and Geographical, of the Rhododendrons recently discovered in the mountains of Eastern Himálaya, from drawings and descriptions made on the spot, during a Government Botanical Mission to that country; by Joseph Dalton Hooker,

R. N. Edited by Sir J. W. Hooker, K. H.—PRESENTED BY THE AUTHOR, THROUGH HON'BLE SIR J. W. COLVILE.

Notes of a tour in the Plains of India, the Himálaya, and Borneo; being extracts from private letters of Dr. J. D. Hooker. Part II. Calcutta to Darjiling. London 1849, 8vo.—BY THE SAME.

Observations made at the Magnetical and Meteorological Observatory at Bombay; in the year 1846. Printed under the superintendence of A. B. Orlebar, Esq. Bombay 1849. 4to.—BY THE GOVERNMENT OF BOMBAY.

An Historical Account of the Royal Hospital at Greenwich. London 1789. 4to.—BY BÁBU RA'JENDRALA'L MITTRA.

A short Life of the Apostle Paul, in Sanskrit verse. Calcutta 1850. 13mo. (2 copies).—BY J. MUIR, Esq., C. S.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of March 1850.—BY THE DEPUTY SURVEYOR GENERAL.

Tattwabodhini Patriká, No. 81.—BY THE TATTWABODHINI' SABHA'.

Journal of the Indian Archipelago for March 1850.—BY THE EDITOR.

Two copies of the same.—BY THE GOVERNMENT OF BENGAL.

The Oriental Christian Spectator, for February 1850.—BY THE EDITOR.

PURCHASED.

Journal des Savánts for December 1849.

The North British Review, No. 24.

Annals and Magazine of Nat. History for February, 1850.

Comptes Rendus. Tome XXIX. Nos. 25-7.

To the Secretary of the Asiatic Society.

SIR,—I have the honour to present the following report of donations made to the Zoological Department of the Society's Museum during the months of March and April.

1. From Dr. Kelaart, Staff Asst. Surgeon, Newera Elia. A small collection of birds' skins from that locality, comprising several undescribed species.

2. Lt. James, N. I. Sellections from a collection of skins of Mammalia and Birds, made in Kunáwar, Kashmir, and Tibet.

3. Bábu Rajendra Mallika. Specimens of *Lemur niger*, Geoffroy, and *Gazella subgutturosa*, female; also carcass of a female Nilgai.

4. Mr. Moxon, of the Pilot Service. Some fine examples of *Larus icthyäetus*, Pallas, and skeleton of this bird and of *Onichoprion anasthœtus*.

5. Mr. W. Driver. Carcass of an adult female *Hylobates hoolock*.

6. Mr. G. K. Rode. Caterpiller of an *Acherontia*.

7. Mr. Muller. 3 species of Ophidia, from Darjeling.

8. Capt. Sherwill. A few shells from the vicinity of Rajmahal.

9. Capt. Thos. Brodie. Skin with horns of apparently a large female of the animal described by Mr. Hodgson in No. XXXVII. *(N. S.)* of the Society's Journal, by the name *Budorcas taxicolor*. *N. B.* Various skins of this species have at various times been presented to the Society, by Major Jenkins, and Capt. E. L. Smith of Sadiya; but only one, a female, in a fit condition to be set up, which has been mounted. I had postponed describing it until I could obtain a perfect skull; and may here remark that I believe its affinities to be strictly *Caprine*, with little relation either to the Bovine group or to the Gnoos *(Catoblepas)*, notwithstanding the very remarkable form of the horns.

I have the honour to be, Sir,

Your obedient servant,

E. BLYTH.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of April, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.854	77.0	77.5	75.2	N. W.	Cirro-strati	29.915	87.0	85.9	78.2	S. W.	Cirro-strati	29.882	91.0	90.4	79.4	S. W.	Cumuli
2	.865	73.0	73.3	70.0	S.	Cirro-cumuli	.916	86.3	86.8	75.2	S. W.	Ditto	.879	93.2	92.7	75.3	W.S.W.	Cirro-strati
3	.932	76.8	77.0	74.0	S. W.	Cloudy	30.015	88.3	88.3	76.2	N. W.	Cirro-cumuli	.986	93.3	93.0	73.8	N. E.	Ditto
4	.948	78.0	78.5	76.3	S. W.	Cirro-strati	29.971	89.2	88.0	77.8	S.	Cirro-strati	.917	93.8	93.3	78.0	S. W.	Ditto
5	.953	72.0	72.3	69.0	N. W.	Ditto	.991	85.8	85.0	73.4	W.NW.	Ditto	.950	91.7	91.3	75.0	S. W.	Ditto
6	.957	76.0	76.5	72.5	N.N.W.	Ditto	30.037	88 7	86.9	72.0	N.N.W.	Clear	30.003	92.0	91.2	73.9	N.N.W.	Cirro-cumuli
7S	.887	76.0	76.2	72.3	N. W.	Clear	29.930	90.0	89.4	74.9	W.	Ditto	29.884	94.4	94.4	74.7	W.	Cirro-strati
8	.796	78.0	78.5	75.2	S. W.	Cirro-cumuli	.857	82.4	82.6	70.2	N.W.sp.	Cloudy	.854	86.7	85.5	72.3	N.	Cloudy
9	.821	76.1	76.8	73.3	S.	Ditto	.870	88.0	87.0	76.7	S. E.	Clear	.825	93.1	92.8	76.4	S. W.	Cumuli
10	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
11	..	..	..	..	....	.....	..	..	..	..	....	....	..	..	..	..	....	....
12	.824	74.7	75.0	74.2	N.	Cloudy	.847	86.2	84.5	74.0	S. E.	Cirro-cumuli	.810	91.0	90.2	74.6	S. W.	Cirro-cumuli
13	.807	72.7	72.9	72 0	N.	Cirro-cumuli	.823	86.0	85.2	74.0	S. W.	Clear	.779	91.6	90.7	75.3	S. S. W.	Cumuli
14S	.732	78 9	79.3	76.5	S.	Cumuli	.763	88.8	88.7	79.0	S. W.sp.	Cumuli	.708	93.4	93.0	80.6	S. W.sp.	Ditto
15	.693	80.5	81.0	78.0	S.	Clear	.752	90.8	90.7	81.0	S. W.	Clear	.723	96.0	95.7	79.7	W.S.W.	Clear
16	.700	80.7	81.5	79.4	S.	Cirro-cumuli	.773	87.2	87.7	81.3	S.	Cloudy	.743	95.0	95.0	78.2	S. W.	Cirro-cumuli
17	.734	77.3	77.0	74.0	S. W.	Ditto	.825	94.2	94.0	71.2	W.N.W.	Cirro-cumuli	.796	99.6	99.0	71.5	N.N.W.	Ditto
18	.879	75.9	76.4	74.0	S. S. W.	Clear	.885	92.2	91.8	74.0	S. W.	Ditto	.863	98.2	97.4	72.9	W.S.W.	Ditto
19	.812	79.3	80.2	77.3	S. W.	Cloudy	.850	90.2	89.8	79.0	S. W.	Clear	.824	96.3	96.3	77.3	S. W.	Clear
20	.797	77.2	77.7	75.8	S. W.	Cirro-strati	.831	89.3	89.3	77.8	S. W.	Cirro-strati	.775	97.4	97.3	75.0	S. W.	Cirro-strati
21S	.801	76.2	76.8	70.8	S. E.	Ditto	.854	88.7	87.7	73.3	S. W.	Cloudy	.827	94.0	93.0	73.2	S. W.	Cirro-cumuli
22	.830	76.8	77.0	75.4	S. W.	Cirro-cumuli	.888	90.2	89.4	79.0	S. W.	Clear	.851	95.2	94.7	77.0	S. W.	Clear
23	.848	76.9	77.2	72.7	S. W.	Ditto	.909	89.0	88.2	76.4	W.	Cirro-strati	.874	92.3	91.6	76.8	W.N.W.	Cirro-strati
24	.788	77.0	76.8	71.3	WN. W.	Cirro-strati	.851	94.2	93.3	76.4	W.NW.	Cirro-cumuli	.802	96.2	94.2	77.2	W.	Cirro-cumuli
25	.767	76.0	76.0	70.6	N. N. E.	Cirro-cumuli	.816	88.7	87.8	72.0	N.	Ditto	.801	92.3	90.6	71.0	E.	Cloudy
26	.770	78.3	78.3	70.7	E.	Drizzly	.831	84.0	83.3	72.2	E.	Cloudy	.809	89.0	87.9	74.6	N. E.	Ditto
27	.674	77.3	77.8	76.2	N. E.	Rainy	.657	79.2	79.8	77.7	E.	Rainy	.642	79.6	80.0	77.0	S. E.	Rainy
28S	.760	77.7	78.1	73.0	W.S.W.	Cloudy	.818	85.7	85.3	76.2	W.S. W.	Cumuli	.800	87.8	88.0	76.9	W.S.W.	Cumuli
29	.774	75.0	75.3	73.8	N. W.	Cirro-cumuli	.824	87.2	86.4	78.4	W.	Clear	.791	91.8	91.2	80.4	S.	Ditto
30	.730	79.7	80.0	78.3	S.	Scattered clouds.	.755	88.3	88.0	80.3	S.	Cumuli	.728	91.1	90.8	81.3	S.	Ditto
Mean	29.812	77.0	77.2	74.0	....	.....	29.859	88.1	87.5	76.0	....	....	29.826	92.8	92.2	76.1	....	...

CENTRAL LIBRARY

JOURNAL

OF THE

ASIATIC SOCIETY.

No. V.—1850.

A Nineteenth Memoir on the Law of Storms in the Indian and China Seas, being the Cyclones of the Sir Howard Douglas *and of H. M. Brig* Jumna *in the Southern Indian Ocean. January to April*, 1848.

By Henry Piddington, *President of Marine Courts.*

The Cyclones forming the subject of this Memoir are of special interest, as they occurred in the Storm Tract to which I have so often drawn the attention of navigators in the Eastern Seas, and the documents collected afford us good and tolerable data for the tracks. For the documents of the *Sir Howard Douglas'* Cyclone, I am principally indebted to Capt. Twynham, P. and O. Steam Navigation Company's Agent at Point DeGalle, and to J. Stuart, Esq., of Bombay. But on the other hand it should be stated that though subsequent to the *Jumna's* Cyclone there were at one time *eighteen* dismasted or cargo-damaged ships lying in the harbour of Port Louis, in the Mauritius, a Captain of one of them who was most zealously desirous of obtaining information for me and applied personally to every one of the Masters, could only obtain one or two Logs! and this is to be the more regretted as this Cyclone it will be seen throws a new light on the science, and is moreover peculiarly instructive for that dangerous tract of the ocean.

PART I.

The Sir Howard Douglas' Cyclone.

Extract from the Log of the Barque Isabella Blyth *from Calcutta towards London.—From Capt.* H. P. Baylis, *Ship time.*

Thursday, 13th January, 1848.—Noon. The N. W. monsoon experienced the last few days getting very light and variable, as though we should soon lose it. Bar. 29.92; Simp. 29.75; at which they have stood for some days.

Noon.

Lat.	8° 4′ south.
Long. by Chron.	89° 07′ E.
Do. Lunars	89° 03′.

Friday, 14*th January*, 1848.—First part light N. W. breeze, shifting suddenly at 5.30 P. M. to east and soon after E. S. E. leading us to hope we had the S. E. trade.

Midnight moderate at east becoming however light and variable. A heavy swell from the westward.

	Bar.	Simp.	Ther.
8 P. M.	29.91	29.76	83.
Noon	29.88	29.75	84.

Noon.

Latitude,..... 9° 22′ S.
Long. by Chron. .... 88° 39′ E.
Do. Lunars, ... 88° 47′.
Course and Dist. S 20 W. 84 miles.

Saturday, 15*th January*, 1848.—First part light baffling airs with gloomy showery weather settling down about 8 P. M. into the S. E. trade.

A very confused heavy swell from the west meeting a lesser swell from the eastward causing the ship to be very uneasy. *Should think it must have been blowing hard somewhere to the westward.*

	Bar.	Simp.	Ther.
8 P. M.	29.90	29.80	82
Noon, ...	29.91	29.81	82½

Noon.

Latitude,..... 10° 59′ South.
Longitude, ... 87° 25′ East.
Course and Dist. made S. 37 W. 121 miles.

Experienced a current these 24 hours of 37 miles setting S. 79 W.

On the 16th, weather still unsettled and in 12° 38′ S.; and 85° 25′ east; with a heavy N. W. swell throughout.

In his letter to me Capt. Baylis says, "from the 13th to the 17th January, 1848, a hurricane or severe gale must have been at no very great distance from me as is proved by the circumstance of the *Sir Henry Pottinger* cutting away her foremast in a hurricane on the 14th January in Lat. 9° S; Long. 83° 0′ East. I being on the same day in Lat. 9° 22′ S.; Long. 88° 39′ east; distant from him S. 86° east; 339 miles."

Captain Baylis wrote from London to Liverpool to obtain the Log of this ship and the John Bull* but had no reply from either of the commanders!

Ship WELLESLEY, *Capt.* ARROW, *from Calcutta to England.*

Copy of Capt. ARROW'S *Private Log.*

On 10th January, 1848, in 6° 26′ S.; Long. 87° 12′ E.; Bar. 29.96; Simp. 29.36; Ther. 81°. A long swell from west and westerly breeze.

11*th January.*—From 10th, Course S. 23° E. 134′; Lat. 8° 29′ S.; Long. 88° 14′ E.; Bar. 29.94; Simp. 29.30; Ther. 83°. Squally fresh breeze S. W. and fine with a heavy head sea.

* I have obtained no account of what occurred to them.

Wellesley, January, 1848.

		Course and Dist.	Lat.	Long.	Ther.	Bar.	Simp.
12*th.*	First and middle parts @ S. W. very squally and unsettled W. and high sea from S. ship pitching deep. Latterly increasing to fresh gale @ N. W. with very heavy cross sea both from S. and S. W. heavy lurid appearance and continued heavy rain, making preparations for bad weather.	Per D. R. S. 4° W. 134′	10°.42′	87°.55′	81°	9 A. M. 29.82	29.30
						3 P. M. 29.68	29.14
13*th.*	First fresh gale @ N. W. with heavy head sea on and constant rain 4 P. M. drawing @ N. E. with heavy confused and following sea, shipping much water set reefed foresail. Midnight blowing a hard gale @ E. N. E. furled all but treble reefed main topsail and hove to. Latterly moderate @ E. fine, bore up @ S. S. W. and made some sail.	S. 20° W. 120′	12°.42′	87°.16′	83°	3 P. M. 29.70	29.20
						29.74	29.20
						9 A. M. 29.84	29.28
14*th.*	First part out 2nd reefs of courses, steady breeze @ S. E. with high sea and passing showers; 8 P. M. increasing with dirty appearance. In 2nd reefs and reefs of courses, middle blowing fresh at times with squalls and rain and high sea. Latter moderate S. E. breeze and fine out 2nd reefs of courses. Ship knocking about much and taking much water over all.	S. 37° W. 190′	15°.05′	85°.20	82°	3 P. M. 29.80	29.20
						29.94	29.40
						9 A. M. 29.92	29.36
15*th.*	First part steady fresh breeze @ S. E. with every appearance of the trade, out all reefs. Middle part light with passing showers: latterly strong breeze and cloudy and heavy following sea.	S. 62° W. 214′	16°.45′	82°.04′	81°	29.86	29.30
						29.98	29.44

Memorandum on Capt. ARROW'S *Diagram Chart.*

Breeze commenced at S. W. on the 10th and on 11th, at noon was strong and squally at S. W. with head sea, Bar. 29.90; we must have entered into the storm on its N. W. quadrant; Steering south we gradually fell behind it; weather getting worse; and at noon on 12th we were immediately behind it with fresh gale at N. N. W.; and heavy cross sea at S. W. marking where it had passed before: Bar. 29.65; this both from Bar, and the diagram appears to have been our nearest approach; still keeping on S. S. W. course till midnight, when we hove to under treble-reefed main topsail with hard gale at E.N.E. when it got away from us and (at noon) we had on the 13th strong easterly breeze and heavy sea at S. E. Bar. 29.82; we then kept away at S. W. and found the weather rapidly moderating but heavy confused seas on, and at noon on 14th appeared to have got the S. E. trade steady but with high easterly sea. Bar. at 29.90; and rising.

Abridged Log of the ship Sir HOWARD DOUGLAS, *Capt.* OGILVY, *from Newport towards Bombay.—Reduced to Civil Time.*

From Noon 13th to Noon 14th January, 1848, the course and distance were North 149′. with the wind E. b. S. strong gales and squally. At noon 14th Lat. 14° 18′ S.; Long. 80° 49′ E.; Bar. 29.54; Ther. 78°. P. M. midnight strong breezes E. S. E. course N. b. E.; double-reefed topsails.

15th Jan.—Close reefing, wind and course as above. Noon strong gales and heavy squalls. Course N. 8° W. 170′; Lat. 11° 30′ S.; Long. 80° 24′ east; Bar. at 8 A. M. 29.53; Ther. 75°; noon 29.41; Ther. 75°. P. M. wind S. E. course N. N. W., making preparations for bad weather. Bar. 8 P. M. 29.41; Ther. 73°; midnight 29.41; Ther. 70°; position at midnight about 10° 10′ S.; 79° 49′ east.

16th Jan.—Midnight running to the N. N. W. wind about east, called all hands to heave the ship to. Hurricane came on so quick that the foresail and foretopmast staysail were blown away and the ship broached too. Impossible to go aloft; 1 A. M. a tremendous hurricane. Cargo (of coals) shifted; the sea up to the hatches and breaking over all; Bar. to daylight 29.50; Ther. 72°. Wind is said to have veered from E. b. N. to N. N. E. and N. b. E. and then by the west to southward about noon as well as could be observed. Between midnight and noon lost mizen mast and rudder head, so as to leave nothing but the fore and main masts standing. Ship lying with her gunwale in the water from the shifted cargo. 4 P. M. wind about S. S. W. moderating very rapidly.

Midnight moderate with a very heavy sea. Bar. at 8 A. M. 29.53; noon 29.57; midnight 29.60; Ther. from 73° to 76°.

The Ship VICTORIA, *Capt.* POTTER, *from Calcutta bound to the Mauritius.*

Was in about 8° S. Lat. Long. about 80° East when a severe gale commenced P. M. on the 15th January (apparently from the westward). At midnight increasing. At 9½ A. M. a hurricane; lost foretopmast, and main mast, pumps crushed,* 1200 bags of rice thrown overboard, and much other damage done. Barometer about noon 29.47; 29.37, Wind veered from West A. M. to N. W. at noon and to N. N. W. and North. Bar. 29.38 and 29.30. By midnight Bar. had risen to 29.60 and 29.52; and on the 17th weather gradually moderated.

The above is all (that is essential to our purpose) to be deduced from a long account in the newspapers, which, though detailing at length the appearances of the weather and the ship's disasters, does not give positions, wind, courses or distances, or any other data of use to us. We are thus reduced to suppose that she may have been not far from 10° south; and 80° east when close to, but in the rear of the centre, but this is but very vague guessing. The ship being subsequently lost before she returned to Calcutta I was unable to procure her Log.

Abridged Extract from the Log of the Ship ADMIRAL MOORSOM, *Capt.* T. MCGILL, *from England to Colombo. Reduced to Civil Time. Forwarded by Capt.* TWYNHAM.

The *Admiral Moorsom* was at noon, 15th January, in Lat. 11° 2′ S., (Long. not given but about 79° east,) running to the N. b. E. with the wind at S. E. and squally, with close threatening weather, the rate of run is not given. 8 P. M. wind gradually veering from S. S. E. to S. S. W. at midnight, being exactly south at 10. Increasing fast throughout.

16*th Jan.*—At midnight the sky became very black and lowering with constant heavy rain. The Barometer which had been gradually falling all the evening now fell with alarming rapidity,† and the wind had increased to a very heavy gale: kept the ship right before the wind which (A. M.) had veered to S. W. Sea very high. 1 A. M. hove to, all sails blown away. 2 A. M. wind W. S. W. 3, West; violent hurricane from 3 to 5; 4. A. M. wind W. N. W. Sprung bowsprit and lost foretopmast. 5 A. M. wind N. W.; 6, N. W. b. W.; 7, wind N. N. W. 8, N. b. W. 9, North. 10, N. b. E. and at 12, N. E. much abated; by the evening moderate breeze at E. S. E.

* The second instance of this most dangerous accident: See remarks in Fourth Memoir, Journ. Vol. x.

† See remark at the close of the Log.

Remarks.—On the evening before the hurricane the air was exceedingly close, and so hot that it was difficult for any one to remain below in the ship. The Barometer fell gradually all the evening till 1 A. M. it then came down a full half inch in about 45 minutes, but at the same time the hurricane was upon us. It blew with the greatest fury between 3 and 5 o'clock; wind West to N. W. Lowest range of the Barometer 29.03 at 3 P. M. It soon after began to rise as fast as it had previously fallen.

The estimated position of the ship during the height of the hurricane by D. R. from noon of the 15th, was Lat. 9° 30′ S.; Long. 79° 20′ east.

Abridged Extract from the Log of the Barque POLLY, JOHN BINNIE *Master, from Greenock to Bombay.—Civil Time. From* T. SMITH, *Esq. Bombay.*

On the 14th January 1848—P. M. Steady breeze from S. E., all sail set, increasing towards midnight.

15th Jan.—A. M. a large black cloud in the N. E. quarter with strong *chain* lightning coming out of it.* Bar. falling a little. 4 A. M. strong breeze dark gloomy weather. Bar. stationary from 4 A. M. to 7 A. M. when it commenced falling gradually to noon when making preparations for bad weather. At noon strong gale S. E. with rain. Ship running under double-reefed topsails and courses Lat. by Acct. 10° 25′ S.; Long. 79° 00′ East P. M. increasing gale and heavy sea from the S. S. E. Ship running 7 knots to the N. b. E. wind S. S. E. 4.30 P. M. weather looking very wild "atmosphere nearly as black as night." Barometer falling rapidly. 5 P. M. broached to.† Barometer now fell 3 tenths in one quarter of an hour; lying to under bare poles blowing a hurricane, lost foretopmast, ship on her beam ends. During the night appearance of the weather terrific. Barometer at midnight was at the lowest, being then at 27.5 after which began to rise.

16th Jan.—1 A. M. wind N. E. gusts of wind frightful, impossible to hear each other speak to 8 A. M., after which it began to moderate. Noon still blowing a heavy gale. No observation. P. M. moderating. No D. R. is given and no observation was obtained till the 19th when the Lat. was 10° ′22 S.; Long. 75° 10′; E. "shewing that the ship had drifted nearly 4°. West during the hurricane," as she had nothing but calms from that time.

* This was probably the disk of the Cyclone. I do not know what kind of lightning is meant by *chain* lightning.

† Now in about Lat. 9° 46′ S.; Long. 79° 8′ East.

Abridged Extract from the Log of the Ship STRABANE, *Capt.* ANDERSON, *from Glasgow to Bombay.—Civil Time. From* T. SMITH, *Esq. Bombay.*

15*th Jan.*—A. M. light unsteady breezes E. S. E. throughout with sultry weather and a heavy swell from the eastward. Noon Lat. 13° 57′ S.; Long. 73° 11′ east; Bar. 29.70; Simp. 29.23; Ther. 83 to 96°. P. M. breeze freshened from E. S. E. with at first a clear sky and a heavy swell from the eastward. The sky completely covered with the long white streaks commonly called mares' tails, with diminution of the wind. "The Simpiesometer these three days past fell considerably during the day and rose during the night, but it was much lower than it would have been under ordinary circumstances from the light weather we had. This, with the heavy, swell convinced me that it must have been blowing hard not far off, and I mentioned on the 17th, when the gale moderated, to my officers that I did not think we had the worst of it."

16*th Jan.*—A. M. wind E. S. E. fresh breeze veering southerly to S. S. E. and P. M. to S. S. W.* Dull gloomy sky and rain at times. A confused heavy swell from several directions with heavy rain squalls. Noon Lat. 11° 7′ S.; Long. 73° 10′ east; Bar. 29.50; Simp. 28.95; Ther. 83° to 85°. P. M. wind S. S. W., West and N. W. frequent squalls from S. S. E. and rain. 6, heavy rain and squalls from South with "*occasionally a few tremendous rollers from the eastward besides a heavy swell from the southward;*" making preparations for bad weather. At 10 P. M. freshening fast. Midnight a severe gale and rain with fearful squalls. Ship on the port tack standing to the north eastward. Bar. 29.40; Simp. 29.07.

17*th Jan.*—Furious gale from N. W. with very severe squalls and rain. Noon moderating, wind about North, made a little sail. Lat. 9.20′ S.; Long. 74° 17′ east; Bar. 29.55; Simp. 29.00. Ther. 82° to 84°. P. M. to midnight moderating. Bar. at midnight 29.61; Simp 29.26.

The Barque NEW EXPRESS, *Capt.* BARRETT, *from England to Ceylon.*

Was on the 15*th January*, at noon in Lat. 10° 14′ S.; Long. Chr. 79° 2′ east; Bar 29.85 with a strong breeze from S. E. b. E. and a very heavy sea. P. M. S. E. and at 10 P. M. East, heavy squalls; steering to the N. E. b. N. and N. E.

16*th Jan.*—Wind east, very heavy sea, and pitching bows under. Noon Lat. 13° 18′ S. Long. Chr. 79° 45′ East; Bar. 29.85· P. M. wind East, heavy confused sea; steering to N. N. E and N. b. E.

17*th Jan.*—1 A. M. wind E. N. E. 4 A. M. moderate. Lat. 12° 18′ S.; Long. 79° 45′; Bar. 29.90.

* This extract though most carefully made does not give the exact wind at noon We must therefore take it to have been south, and the lowest depression of the Bar. was after this time, when the ship was crossing in front of the Cyclone and he wind was increasing in strength and veering rapidly as she did so.

Tabular view of the winds and weather at Noon on the 14th, 15th and 16th January, 1848, Sir HOWARD DOUGLAS' *Cyclones.*

Date.	*Name of Ship or Station.*	*Lat. S.*	*Long. East.*	*Winds and Weather.*	*Bar.*	*Simp.*	*Ther.*	*Remarks.*
1848. 14th Jan. Noon.	Isabella Blyth.	9°.22′	88°.39′	Light N. E. and E. S. E.	29.88	29.75	84°	A heavy swell from the westward.
	Sir H. Douglas.	14°.18′	80°.49′	Strong gales and squally E. b. S. and E. S. E.	29.54		78°	Ship running to the N. b. E. 149′ in the 24 h. Midnight double reefs.
15th	Isabella Blyth.	10°.59′	87°.25′	Gloomy showery weather settling at 8 P. M. to the S. E. trade.	29.91 8 A. M. 29.53	29.81	82°	A confused heavy swell from the westward meeting a lesser swell from the east. Suppose it to have been blowing hard to the westward.
	Sir H. Douglas.	11°.30′ Midnight 10°.10′	80°.24′ 79°.49′	Strong gales and heavy squalls P. M. wind S. E.	Noon 29.41 8 P. M. 29.14		75° 75° 73°	Ship running to the N. b. W. and N. N. W. 17′ since noon of 14th. Midnight wind about east.
	Admiral Moorsom.	11°.2′	About 79°.0′	S. E. squally and threatening. 8 P. M. veering from S. S. E. to S. S. W. at midnight.				Gale increasing fast throughout.
	Polly.	10°.25′	19°.00′	Increasing gale; noon S. E. P. M. S. S. E.	Midnt. 27.50			A. M. a large black cloud in the N. E. with chain lightning; sea from S. S E. ship running to the N. b. E. 5 P. M. broached to. Midnight hurricane, lost fore topmast. Broached to, in abt. Lat. 9°. 46′ S.; Long. 79° 8′ east.

Date	*Name of Ship or Station.*	*Lat. S.*	*Long. East.*	*Winds and Weather.*	*Bar.*	*Simp.*	*Ther.*	*Remarks.*
1848. 15th Jan.	Strabane.	13° 57′	73° 11′	Breeze fresh from E. S. E. and a heavy swell from the Eastward.	29.70	29.23	83.86°	Ship running to the northward,
	New Express.	15° 14′	79° 2′	Strong breeze S. E. b. E. and heavy sea. P. M. S. E. midnight East.	29.85			Ship standing to the N. E. b. N. and N. East.
1850. 16th Jan.	Sir Howard Douglas.			Uncertain from, the distress of the vessel said to be from E. b. N, to N. N. E.; then by the west and N. W. to southward.	29.50		72°	Ship running to the N. N. W. 1 A. M. overset and cargo of coals shifted, lost mizen-mast, rudder-head, &c. Log uncertain, the Captain having been hurt.
	Admiral Moorsom.	About 9° 30′	79° 20′	Midnight very black and heavy rain, Wind S. W. to West. N. N. W. N. W. N. N. W., North, and at noon N. E.				Position in the height of the hurricane from 3 to 5 A. M. Evening much abated. Sprung bowsprit, lost foretopmast, &c. Fall of the Barometer very sudden.
	Strabane.	11° 7′	73° 10′	Dull gloomy wind veering to S. S. E. P. M. to S. S. West and N. W. Midnight severe gale and rain.	29.50	28.95	83.86°	Heavy confused swell from several directions. Making preparations for bad weather
	New Express.	13° 18′	79° 45′	East wind and heavy sea.	29.85			*Note.*—On 17th, a very severe gale from N. W. Moderating at noon. Lat. 9° 20′ N.; Long. 74° 17′ east; Bar. 29.55. P. M. heavy confused sea.

PART II.

The Jumna's Cyclone.

Abridged Extract from the Log and Admiralty Report of H. M. Brig Jumna, *Lieut.* Rodney, *Commander, from Bombay to England.*

I have received from Capt. Fitzgerald, H. M. S. *Vernon*, then senior officer at Bombay, from Lt. Rodney himself, and from friends, copies of public and private reports and accounts of the dismasting of this fine new Brig, which was on her way from the dock-yard at Bombay to England, but they are all singularly deficient in one respect, viz. that they do not give the vessel's run from the 22nd, though one report actually gives every thing in the Logs of 22nd to 24th April, *but* the distances and positions at noon! An omission no doubt of the copyist's but a very vexatious one to us. The position of the vessel at noon 23rd, (and thence at 11 P. M. when she was dismasted) is however given by Lt. Rodney, but for comparisons with other ships the want of the exact positions, from fine weather to fine weather again, is always requisite, as this serves moreover to fix the limits of the Cyclone influence. The italics in the following abridgment are mine.

From Bombay to Lat. 8° 59′ S.; Long. 85° 34′ east, which position H. M. Brig reached in ten days from Bombay and at 3 A. M. of the 23rd April 1848, the *Jumna* had the usual fair winds, with heavy squalls thunder and lightning, especially at night. At 3 A. M. it came on to blow from N. West; and at 5, veered to West; at 6 A. M. to W. N. W.; and at ½ past 8 (force 10) to noon N. N. W.* The Brig in this interval, 3 A. M. to noon 23rd. had run from 9 to 12 knots to the South and S. S. W., mostly S. S. W.; and is placed at noon 23rd April, by Lt. Rodney in Lat. 10° 28′ south; Long. 85° 0′ east. The Barometer having fallen from 29.57 to 29.33. The Ther. 82° and 82½°.

At 1 P. M. wind is marked N. b. W. (force 10); at 3, N. N. W.; (force 9) and at 4, calm; by which time the Brig had reached Lat. 11° 08′ S; Long. 84° 43′ east by her Log. the Bar. being now at 29.21 and falling; Ther. 82°; great numbers of birds apparently much terrified, hanging about the ship, alighting on the deck and rigging, and allowing themselves to be caught without resistance. Blue sky appeared around the horizon with the exception of the N. E. where a

* There is a discrepancy here which should be noted, and is perhaps again an error of the copyist. Lieut. Rodney's Admiralty Report says, "a gale sprung up at 3 A. M. from North veering at times to N. N. W." while his own copy of the Log and two others which I have, give the winds as above stated. All three cannot be wrong we should suppose? I therefore take them as correct.

very heavy bank of clouds hung, *but there was also an indescribable feeling in the atmosphere.*

At half-past 4, the wind is marked as W. S. W. (force 6). At half-past 6, West; at 7, S. W. and W. b. S. (force 10), and S. W. again at 8 P. M. to midnight; force being marked from 10 to 12, but it is said to have been higher than the figures can express, the run at 11h. and 12h.; and to 4 A. M. of the 24th is marked at 14 knots. The Bar. at 7 P. M. is at 29.19; at 8 P. M. 29.18; at 9h. 29.16; at 10h. 29.18; at 11h. 29.16; and at midnight 29.16: Ther. 81° and 82° throughout. The Brig was hove to at 5.30; but at 8.40 was obliged to bear up, as she heeled over too much to be safe. She was then steered to the N. E. but at 10.45 broached to and went over (about in Lat. 11° 31′ S.; Long. 84° 54′ east) and the mainmast was cut away to right her. After this she continued running, under the foremast only, at the rate of 14 or 15 knots till 4 A. M. when the gale moderated very rapidly, the vessel being by noon 24th April in Lat. 10° 14′; Long. 85° 50′ by Lt. R. The Bar. rose from 29.16 at midnight to 29.42, at noon.*

Abridged Log of the Ship SULTANY, *Capt.* H. H. HANDLEY, *from Mauritius to Calcutta.—Reduced to Civil Time.*

21*st April*, 1848.—Two days previous to this date the wind was varying from North to N. E. with a threatening appearance and a heavy swell from N. N. E. with the Barometer gradually falling. Noon in Lat. 8° 15′ S.; Long. 86° 22′ E.; Bar. 29.75. Reducing sail and preparing for bad weather. Wind North; P. M., N. N. E. at 4: N. E. at 6; and N. N. E. at 10 P. M. to midnight; ship running $6\frac{1}{2}$ knots to the W. S. W. At 10 P. M. under a close reefed foretopsail, gale blowing furiously.

22*nd April*, 7 A. M. Bar. 29.64. Securing everything for a gale. Noon Lat. 9 24′ S.; Long. 84° 35′ East; Bar. 29.63; Ther. 83°. Wind N. E. from 4 A. M.; P. M. N. E. increasing; and at 3 P. M. hove to under close reefed main topsail. Bar. at 2h. 30′ P. M. 29.35; 4h. P. M. 29.12; at 5h. 29.8; 6h. 29.10; 7h. 29.12; to P. M. 29.15; 6 P. M. wind N. E. to 9h. P. M. when North with furious squalls: at midnight N. E.

23*rd April*, A. M. Blowing a hurricane from N. E. ship lying with her lee gunwale in the water, towards noon wind all round the compass, with a dreadful sea and thick dense atmosphere. Noon Bar. 29.16. No observations. Lat. by Acct. 9° 32′ S.; Long. 83° 37′ east; Ther. 83°. P. M. wind marked S. W. Set close reefed mizen topsail and reefed foresail and ran 10 miles north; but at

* A complete Log is given in the Remarks explaining the singular track of this Cyclone.

3 P. M. the gale increasing hove to again. Bar. 29.12 at 6 P. M.; at 7h. 29.15; at 8h. 29.20; 11 P. M. wind West, impossible to blow harder; 11h. 29. 26; midnight Bar. 29.28. From 8 to 10 P. M. vivid lightning with a remarkable red appearance to the S. E. throughout the night.

24th April.—Gale abating. 3 A. M. Bar. 29.27. Wind West at noon, found 4 feet water in the well, sea going down. Noon Lat. Obs. 9° 21′ N.; Long. 85° 8′ East by Indiff. observations; Bar. 29.64; Ther. 83° ½. After which fine weather. Ship by Chr. on this day was 29′ east of Acct. estimating her drift at 3′ per hour throughout.

From the Mauricien of May 24th, 1848, we have the following notices:—

The bark *Samarang* experienced on the 21st April, in Lat. 9° 44′ S.; and Long. 72° E.; a hurricane that lasted 40 hours, wind from N. E. to S. W. Barometer fell to 28.20, bulwarks carried away, sails split, etc.

The *Mary Stoddart* experienced on the 22nd and 23rd April, in Lat. 10° 30′ S.; and Long. 86° 50′ E., a severe hurricane, wind from N. E. to S. W. Barometer 29.10, bulwarks carried away, stern dead lights stove in, and washed away the starboard cabin, rudder damaged; put into this port for repairs.

On the 23rd April, in Lat. 9° 18′ S.; and Long. 84° E.; the *Pemberton* experienced a hurricane; wind from N. N. W. to West and W. S. W., vessel sprung a leak and lost the head of her rudder, and caused her to put in for repairs; threw overboard about 1000 bales cotton.

On the 23rd of April, the *Brig Deborah* being in Lat. 9° 19′ South; Long. 82° 50′ East, experienced a severe hurricane from N. E. to S. W., which laid the ship on her beam-ends for some time, the sea very heavy and the ship straining much. It commenced at 6 o'clock A. M. and blew severely till half past 10 A. M.—*Le Mauricien, May* 24th, 1848.

The following is from some imperfect notes by a Civilian passenger, MR. MELDRUM, *Professor in the College at Bombay, on board the ship* PEMBERTON *from Bombay to the Mauritius; which have been kindly forwarded by Dr.* BUIST *from that gentleman.*

This vessel was without either Barometer or Simpiesometer; the Barometer having been broken "the Captain did not think it at all important to have it repaired!" And it will be seen that the ship's position is recorded on two days only, once at noon and once near the centre of the Cyclone, which last is however very important.

Thursday, 20th April, 1848.—Wind to-day from N., sky still dark and gloomy with heavy cumuli; Lat. 6° 31′ 10″ S.; Long. 83° E.; a heavy squall about 6 o'clock.

Friday, 21st April.—Sky lowering, wind shifting about; but it is almost calm, very gloomy, no observation; in the evening dead calm, soon after cleared up a little towards S., and a light breeze sprung up from S. W.; about midnight wind increased and blew pretty hard; flocks of sea birds.

Saturday, 22nd April.—Strong gale from N. by E., sky pretty clear towards horizon, wind shifting from N. by E. towards S. and S. by W. with great violence, rudder damaged by a heavy sea; sea raging, much rain; Lat. 9° 41′ 17″ S.; Long 83° 55′ east; about midnight weather moderated but sea ran tremendously high.

Sunday, 23rd April.—At 4 A. M. wind got up again and blew from S. by W. with greater violence. By noon, it was at its height, bulwarks driven in (the top gallant masts had been housed) scrambled on deck, clouds tattered, meeting with the spray, lower strata appear to move in a direction contrary to the upper, perhaps owing to their difference in velocity. After some hours the wind began gradually to abate and shift towards S. and S. E. By 6 o'clock it was pretty quiet, sea running very high.

Abridged Log of the Ship SAMARANG, *Capt.* BUCKLE, *from Calcutta to the Mauritius.—Reduced to Civil Time.*

21st April.—At noon in Lat. 8° 76′ S.; Long. 86° 14′ east; wind N. E. b. N. Increasing breeze and squally; course S. W. 8 knots. Bar. 29.79; Ther. 83°. P. M. wind N. E. b. E. course as before to midnight. At 10 P. M. moderating but Barometer (which is registered every hour) falling from 29.79: at 1 P. M. to 29.68 at midnight, when squally with rain.

22nd April.—A. M. increasing with hard squalls; wind N. E. b. E., course as before; 7 A. M. 8 knots to the S. W. *Day light more moderate again.* At 10 A. M. increasing to a gale. Preparing for bad weather. Bar. falling from 29.67 at 1 A. M. to 29.52 at noon, when wind about E. N. E. a gale. No observations Lat. Act. 10° 27′ S.; Long. 83° 34′ East. Fresh gale and high sea. P. M. wind E. b. N. Gale increasing, hove to at 1 P. M. 6 P. M. wind E. N. E.; 10 P. M. East; at 8, increasing to a hurricane. Bar. falling from 29.52 at 1 P. M. to 29.39 at 6 P. M.; rising to 29.45 at 8h. and falling again to 29.39 to midnight.

23rd April.—A. M. hurricane still increasing, wind S. E., sea tremendous. 3 A. M. blowing with terrible fury, hove 300 bags of rice overboard. At 4, ship easier but hurricane still raging. All hands at the pumps for many hours. At 8, wind South, squalls not so heavy. Noon hurricane more moderate. Bar. from 29.39 at 1 A. M. to 29.50 at noon; Ther. 76°; Lat. Acct. 10° 32′ S.; Long. 82° 10′ east. Wind South decreasing; 3 P. M. S. S. W. 8 P. M. West. Bar. from 29.48 at 1 P. M. to 29.62 at midnight with the gale constantly decreasing.

24th April.—A. M. wind S. S. W.; at 6 A. M. S. b. W.; Bar. from 29.62 at 1 A. M. to 29.72 at noon, when a strong breeze at S. b. W. with a very high

sea. Lat. Obs. 10° 37′ S.; Long. 82° 22′ east. Course and distance S. 59° W. 269 miles in 2 days by Chr. giving 11′ of Southing and 93′ of Easting for the storm current and storm wave.

Abstract from the Log of the Barque BRAEMAR, *Capt.* TETHERINGTON, *from Calcutta to Mauritius.—Reduced to Civil Time.*

21st April, 1848.—At noon Lat. 6° 43′ S.; Long. 88° 10′ east; Bar. 29.77; Ther. 84°. P. M. wind N. E. to East, steering to the S. S. W. 5 to 6 knots per hour. Cloudy with a confused sea on.

22nd April.—A. M. fresh gales N. N. E. with a high rolling sea; towards Noon wind N. E. b. E., sea increasing. Course always S. S. W. Lat. 9° 01′ S. Long. 86° 46′ east; Bar. 29.74; Ther. 82°. P. M. wind N. E. Fresh gales drizzling rain and a high rolling sea. 8, increasing "*with heavy seas from the N. West S. E. and S. W.*" Close reefed; to 6 P. M. steering S. S. W. and afterwards South. Wind N. E., Bar. 29.54 at 4 P. M. and 29.58 at midnight.

23rd April.—A. M. ran 48′ south and hove to in Lat. 11° 9′ S.; Long. 86° 28′ east by Acct.; wind N. E. (apparently) to 10 A. M. when it is marked E. N. E. 8 A. M. "gale suddenly increasing." Noon a high turbulent sea, Lat. Acct. 11° 7′ S.; Long. Acct. 85° 54′ E.; Bar. 29.45. Vessel lying S. S. E. drift marked 1.4 per hour with wind marked E. N. E. 2 P. M. wind E. N. E. Bar. 29.45. 8 P. M. 29.35; wind *veered* to S. E. Midnight a perfect hurricane, with a terrific sea on, making a clear breach over all. Bar. midnight 29.25.

24th April.—2 A. M. hurricane veered to the southward (it is *marked* South at midnight). And at 4, S. S. W. still increasing. At 3, vessel on her beam ends; Bar. 29.16; and being in danger of foundering cut away the mainmast; 4.30 P. M. Bar. began to rise; lowest point being at 4 A. M. 29.15. Forenoon hurricane slightly abating, with a tremendous sea from N. West; N. East; S. E. and S. W. Bar. at noon rising; Lat. 11° 27′ S.; Long. by Acct. 85° 68′ east. P. M. to midnight wind S. S. W. decreasing to strong breezes.

25th April.—To noon moderating from S. S. W. making sail. Lat. Obs. 11° 9′ S.; Long. 85° 02′ east; Bar. 29° 70′; Ther. 84° 00′.

Abridged Log of the Ship LADY SALE, *Capt.* CASTOR, *from Calcutta to the Mauritius.—Reduced to Civil Time.*

20th April, 1848.—Steady breeze at N. W. and North to midnight.

21st April.—Wind North, strong breeze and squally, increasing to noon with a heavy sea from the S. E. Noon Lat. Obs. 8° 16′ S.; Long. 86° 35′ East. Course and distance from noon 21st S. W. ¾ S. 147′.* P. M. wind North at 6 P. M. N. E. 3.30, a heavy squall. Bar. falling to 29.40; from 29.70; (in the

fine weather of the 20th it is supposed, as the exact time is not given). At 11, hard squalls and a high sea Bar. 29.35.

22nd April.—Preparing for bad weather. Noon hard gales and high sea, wind veering to the Eastward. Lat. Acct. 9° 10′ S.; Long. about P. M. severe gales E. N. E. threatening weather and dismal appearance. At 4, wind East; at 6, E. S. E.; at 10, S. E. Close reefing and battening down hatches and making all preparations for a hurricane. 4 P. M. Bar. 29.20. Gale increasing with violent gusts.

23rd April.—At 2 A. M. hove to; Bar. 29.18; at 5, gale increasing to a hurricane and veering to the Southward. 5.30 ship on her beam ends with the lee rail buried in the water. Cut away the mizen mast and quarter boats and hove some cargo overboard. Wind veering fast to S. W. but blowing with indescribable violence. Bar. 29.15. At 4.30 A. M. Bar. 29.32; but abating; noon Bar. 29.40. P. M. strong breezes S. b. W. and South, and S. b. E. at midnight.

24th April.—Fine. Noon Lat. Obs. 10° 44′ S.; Long. 81° 24′ east; wind S. b. E.

In addition to his Log, Capt. Castor has farther obliged me with the following notes:—

From the 20th April to the morning preceding the hurricane the winds prevailed mostly from N. W. to N. with a long swell rolling to the Southward from the N. E. with hard squalls, accompanied with heavy showers of rain. The wind gradually veered from N. N. E. to E. and S. E. ending with indescribable fury at S. to S. W. The moon was encircled with an immense halo which had the appearance of a dense cloud for three successive days before the Cyclone; the light of the moon, and stars was uncommonly brilliant during the existence of the halo, a great oppression in the atmosphere was felt. Sky at night almost cloudless, the wind never *shifted* in this hurricane, but veered gradually, the sea ran high, and rain poured down in torrents, accompanied with violent gusts every fifteen to twenty minutes. Bar. two days previous to the hurricane stood at 29.70, and fell gradually with the state of the weather to 29.15; and remained at that range during the height of the storm. It began to rise an hour or two before the worse part abated. After the hurricane the winds prevailed for two days from the southward and westward, light and variable, with a long swell from the S. E.

N. B.—The wind was stronger than in the hurricane experienced on the 16th of November, 1839, when Coringa was inundated, but the sea less. I remember the wind in that storm shifted from four to six points, but in this it veered gradually.

Extract from a Tabular Statement of the Voyage of the H. C. Pilot Brig SALWEEN, *from Port Leschenault to Calcutta.—Nautical Time.*

21st April, 1848.—Made 67 miles to the W., N. W. winds variable N. E. to N. N. W. Lat at noon 6° 20′ S.; Long. 86° 6′ east; Bar. 29.30 to 29.60; Ther. 81°. Light winds, squally wet weather, thunder, lightning and rain, and threatening appearance with a N. N. W. sea.

22nd April —Made 19′ to the N. W. b. W. ½ W. only; winds variable from N. E. to N. N. W. and Northerly. Lat. at noon 6° 20′ S; Long. 85° east; Bar. 29.60 to 29.75; Ther. 83°. Squally wet dirty weather with a bad threatening appearance! *Am sure we are not far from some very severe weather from the very threatening appearances of some days past.* Sent top gallant masts on deck and made all due preparations for meeting a hurricane. Spoke H. M. Brig *Jumna*, 9 days from Bombay, running to the southward.*

Abridged Log of the Ship FUTTLE ROZACK, *Capt.* RUNDLE, *from Calcutta to the Mauritius.—Civil Time.*

This able Log affords a valuable and instructive example of a ship being caught in front of a Cyclone in the Southern Hemisphere, and though bound to the W. S. Westward running to the N. Westward to allow the centre to pass. The passages in italics are so marked by myself, and I may add that the *Futtle Rozack* is a heavy sailing ship, and was deeply laden with rice and coolies.

From the 17th April, when in Lat. 5° 53′ S.; Long. 86° 4′ East at noon to the —

19th of April.—At noon in Lat. 7° 38′ S.; Long. 85° 36′ east; the ship had light variable winds all round the compass with calms and squally appearances at times; the Bar. being on 17th at noon at 29.71; Simp. at 29.27 and Ther. 84°; and on the 19th Bar. 29.60; Simp. 29.27; Ther. 82°. On the 18th, Capt. Rundle remarks —"Noon light breeze and cloudy, Bar. and Simp. very low and have been gradually going down this last four days. Preparing for bad weather." And P. M., again, that "the weather is suspicious, or rather that the continued fall of the Bar. and Simp. is so, but the *weather* altogether does not appear to indicate the approach of any great change more than we might expect on the verge of the S. E. trade, although this heavy S. E. swell rolling up is suspicious."

* I regret much that this Register is in Nautical Time and that there is no hour affixed to this notice.

On the 19th April.—From A. M. to noon winds variable from N. N. E.; North-West; W. S. W.; S. W. b. W. and S. W. ship running to the S. S. W., S. W. b. S; South; S. S. E. and S. E. from 2 to 7 knots; squally unsettled weather and S. E. swell. Noon moderate. Light S. S. W. breeze, heavy sea with dark ponderous masses of clouds rolling up from the southward to the zenith and then gradually disappearing. Lat. Indiff. Obs. 7.38 S.; Long. 85° 36′ East; Bar. 29.60; Simp. 29.27; Ther. 82°. P. M. S. E. airs and a stationary bank of dark Nimbi to the S. Eastward. Clouds A. M. Cumuli, cumulo-strata, and dense packed Nimbi. To midnight wind increasing and decreasing from the S. E. every 3 or 4 hours.

20th April.—A. M. winds East to N. E. and E. N. E. at 10 A. M., and moderate. Ship making from 7 to 4.4 knots to the S. S. W. Noon Lat. Acct. 9° 14′ S.; Long. 85° 14′ East; Bar. 29.52; Simp. 29.20; Ther. 83°. P. M. wind N. E.; E. N. E. and East at 6 P. M. when again S. East, E. N. E. and N. N. E. to midnight. At 4, clear sky to the North, and dark and heavy to the Southward, midnight fresh N. N. E. breeze and very heavy rain clouds. P. M. dense strata.

21st April.—A. M. strong squalls N. E. veering to East and to E. S. E.; at 4 A. M. with heavy rain; daylight strong gales and heavy sea. Weather like the commencement of a strong trade, but Bar. and Simp. too low to feel satisfied with appearances. Noon fresh gales S. E. (from 10 A. M.) Lat. Obs. 10° 23′ S.; Long. Chr. 84.5; Bar. 29.55; Simp. 29.20; Ther. 83°. Clouds A. M. Cirro cumuli, leaden stratus to S. E. P. M. threatening weather to the Southward, wind S. E.; at 2, S. S. E. veering to E. b. S.; at midnight marked S. E. again; at 5, strong gales, and at 8, heavy gusts at intervals with a frightful turbulent swell and a confused sea breaking heavily all round "as if the ship was surrounded by coral reefs." *From 9 to midnight more moderate.* Bar. 29.54; Simp. 29.18; Ther. 82°. Clouds P. M. leaden coloured.

22nd April.—A. M. wind E. S. E. to S. E. 10 A. M. S. E. b. S. At noon S. E. 2 A. M. dense threatening arched banks, continually rising from S. E. with much rain and tremendous squalls. 9, squalls continue with frequent lulls. Bar. at 29.48 and continuing to fall. *Feeling convinced that if we stand any farther to the Southward (S. W.) we shall get involved, and that the storm is tearing down on us from the Eastward.* At 10, stood away N. W. to get clear of its influence. At 11, very high sea at intervals, strong squalls, wind veering to the Southward. (S. E. b. S.) Noon the same with a gloomy leaden appearance; Lat. D.R. 11° 38′ S.; Long. 82° 49′ East; Bar. 29.50; Simp. 29.21; Ther. 82°. Clouds A. M. heavy low leaden strata. Ship now running 6 knots to the N. W. P. M. more moderate; under close reefed fore and main topsails; at 2. tremendous turbulent sea rising in heaps. Wind S. S. E. at 1; S. b. E. at 3; S. S. E. at 5 P. M.; after which alternating from S. ¼ E. to S. E. to mid-

night. At 3 P. M. same gales. Sun inclined to break through the clouds. At 6, squalls less frequent. A red lurid appearance to the W. N. W. Bar. from 29.49 to 29.52; at 9 P. M. Simp. 29.19 to 29.93. Ther. 81°. Midnight thick weather and rain. Clouds, heavy stratus. Stationary cirrus over all.

23rd April.—A. M. less wind and sea except in the squalls, with occasional rain. Wind S. b. E. to S. E to 5 A. M. when South to noon. Bar. 29.49 to 29.54; Simp. 29.16 to 29.20; Ther. 82°; 2.20 A. M. moon and stars shining brightly. Ship running to the N. W. till 10 A. M. when North till noon. Daylight more sea; at 6 A. M. fine and clear over head, moon shining brightly. Lofty wavy cirrus from N. E. to S. W. Gloomy appearance towards the horizon from North to Eastward and S. Westward, *tremendous high curling seas at intervals.** At 8, wind South; lofty cirri and dark cumulo-strata with rounded edges rolling up from S. S. E. Less wind, Bar. rising, bore away to North at 10 A. M. Noon moderating from over head, but threatening spherical cumulo-strata rolling up from Southward *with tremendous overgrown seas at intervals.* Wind moderating. Lat. Obs. 9° 45′ S.; Long. 80° 28′ East; Bar. 29.54; Simp. 29.20; Ther. 82°. P. M. kept a N. E. course; at 2 steady gales South to S. b. E. thick and threatening appearance to Southward *and tremendous seas at intervals.* At 4, Cyclone seeming to have a slow progression to the Westward; resolved instead of steering to get to the Eastward of it (behind it) to run to the Westward, and should we find it coming up again can easily get out of its influence by running to the Northward. Stood to the Westward at 9 P. M. 10, light squalls with rain at intervals from arched Nimbi rising from the South and rapidly approaching the zenith; stars visible but sickly appearance. Wind South to S. b. E. throughout. Bar. P. M. 29.50 to 29.60; Simp. 29.18 to 29.24; Ther. 82°. Clouds; packed dark cumuli to S. East: Stationary cirri over all.

24th April.—Weather gradually becoming fine. Winds moderate at South to S. b. E. to noon, when Lat. 9° 39′ S.; Long. 78° 37′ East; Bar. 29.60; Simp. 29.22; Ther. 83°. At 4 A. M. ponderous clouds to S. East, scud flying with great rapidity to the Northward.

The following extract is from the Calcutta *Englishman*. I have been unable to obtain a copy of the *Hardwicke's Log*.

A friend has sent us the following extract from the letter of a passenger on board the *Earl of Hardwicke*:—

* These high curling seas at intervals appear well worthy of consideration, I have often met with notices of them. They are no doubt the *resultant* waves of the distant Cyclone forces.

"From the 18th March, 1848, the day on which the *Hardwicke* left the Sand Heads, until the 19th April, we had hot sultry calm weather, but upon the 22d April, 1848, in Lat. 12° South; Long. 83° East; we had a fearful hurricane, which lasted 3 days. It blew from the S. E. and, under Providence, I consider that Mr. Piddington's instructions saved us from being foundered. The Captain, Lewis Browne, had been studying his book a whole month before the hurricane commenced, so that, when it did come, he was prepared, and being in the proper spot he lay to, and so the storm passed us. I have been to sea pretty often, but I never saw anything so awful as the sea during the three days that we lay to. I forgot to get the extract from the Log; but get it you must, as it will be a good link in the chain of this invaluable branch of knowledge."

In a letter from Capt. Faucon, American Brig *Frolic*, he mentions that—

The *Ormelie* of Glasgow, from Calcutta to Liverpool, reports, that on Sunday last, April 23rd, 1848, he was in 8° S.; and 89° East; had a heavy gale from the Westward; lost top gallant masts, jibboom, &c. and sprung his bowsprit.

Tabular view of the Winds and Weather from the 21st to the 23rd April, 1848.

THE JUMNA'S CYCLONE.

Date.	*Name of Ship or Station.*	*Lat. S.*	*Long. East.*	*Winds and Weather.*	*Bar.*		*Simp.*	*Ther.*	*Remarks.*
1848. 21st April.	Braemar.	6° 43′	88° 10′	Cloudy and confused sea. Wind N. E. to East.		29.77	..	84	Vessel steering to S. S. W.
	Sultany.	8° 15′	86° 22′	Variable winds from North at Noon, to N. E. and N. N. E., P. M.		29.75	..	..	Reducing sail and preparing for bad weather. Threatening appearance, and heavy swell from N. N. E.; 10 P. M. under close reefed fore topsail.
	Samarang.	8° 16′	86° 14′	Increasing breeze N. E. and squally. P. M. N. E. b. E. squally.		29.79	..	83°	Vessel running S. W. 8 knots. Ten P. M. moderating, but Bar. always falling.
					Mid.	29.68			
	Lady Sale.	8° 16′	86° 35′	Noon, North, strong breeze. P. M. North. 6 P. M. N. E. 11, hard squalls.	P. M.	29.40	..	..	Noon heavy sea from S. E. Ship running to the S. W.
					Mid.	29.35			
	Futtle Rozack.	10° 23	84° 5′	A. M. strong squalls N. E. to East and E. S. E. Noon S. E. fresh gales. P. M. threatening to the South, wind S. E. and S. S. E.; E. b. S. and S. E. at midnight.		29.55	29.20	83°	By 5 P. M. strong gales with heavy gusts, with a turbulent swell and confused sea. 9 to Midnight, more moderate.
					Mid.	29.54	29.18	82	

Date.	Name of Ship or Station.	Lat. S.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
1848. 22nd April.	Braemar.	9°.01′	86°.46′	N. E. b. E. P. M. N. E. fresh gales, drizzling rain.	29.74 4 P. M. 29.54 Mid. 29.58		82°	Ship running to the S. S. W. and South. High rolling and confused sea.
	Sultany.	9°.24′	84°.35′	N. E. increasing. 9 P. M. North, Midnight N. E. furious squalls.	7 A. M. 29.64 Noon 29.63 2 P. M. —.35 4 ——— .12		83°	Increasing gale throughout. 3 P. M. hove too.
	Samarang.	10°.27′	83°.34′	A. M. N. E. b. E. hard squalls. At 10 a Gale.	1 A. M. 29.67 Noon —.52			Ship running 7 and 8 knots to the S. W.
	Lady Sale.	9°.10	..	Noon hard gales and high sea, Wind Veering to Eastward. P. M. E. N. E. 4 East; E. S. E. 10 S. E. increasing.	4 P. M. 29.20			Preparing for bad weather P. M. threatening.
	Futtle Rozack.	11°.38	82°.49′	A. M. E. S. E. to S. E.; 10 S. E. b. S. Noon S. E. b. S. P. M. more moderate. Wind S. S. E. to S. ½.; E. and S. E.	9 A. M. 29.48 Noon 29.50 P. M. 29.49 29.52	29.21 29.19 28.93	82°	2. A. M. Dense threatening clouds. 9 heavy squalls and frequent lulls. At 10 stood N. W. to clear the Cyclone. Running 6 knots to the N. W. Midnight thick weather and rain.

Date.	Name of Ship or Station.	Lat. S.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
1848.								
23rd April.	Braemar.	11°7′	85°.54′	To 10 A. M. N. E., when E. N. E.; 8 increasing suddenly. P. M. E. N. E. 3 P. M. Veered to S. E. Midnight hurricane South.	29.45 29.45 8 P. M. 29.35 Mid. 29.26			Ran 48′ South and hove to. Lying to, terrific sea. Head S. S. E.
	Sultany.	9°.32	83°.37′	A. M. Hurricane from N. E. Noon wind all round the compass. P. M. S. W. 11 P. M. West.	29.16 6 P. M. —.12 7 ——— .15 8 ——— .20 Mid. —.28			A dreadful sea and thick dense atmosphere from 8 to 10 P. M. Vivid lightning with a remarkable red appearance to the S. E. all night.
	Samarang.	10°.32′	82°.10′	Hurricane S E. 8 A. M. South. Noon more moderate P. M. South 3 P. M. S. S. W. 8 P. M. West.	1 A. M. 29.39 Noon 29.50 1 P. M. 29.48 Mid. 29.62	76°		Heaving cargo overboard and all hands at the Pumps.
	Lady Sale.			5 A. M. Increasing to a hurricane and veering to the South and S. W. Noon abating. P. M. Strong breeze. S. b. W. to S. b. E.	2 A. M. 29.18 5 30 29.15 4 A. M. 29 32 Noon 29.40			5. 30. Ship on her beam ends; cut away mizen mast and hove cargo overboard.

Date.	Name of Ship or Station.	Lat. S.	Long. East.	Winds and Weather.	Bar.		Simp.	Ther.	Remarks.
1848. 23rd April.	Futtle Rozack.	9.45	80.28	S. b. E. to S. E. at 5. South to Noon. Less wind 6 A. M. fine and clear 8 South, 2 Steady gales S. to S. b. E.		29.49	29.1°	82	Ship running to the N. W. till 10 A. M. and North till Noon.
						—.54	29.20	82	
					Noon	—.54	—20	82	P. M. Wind South to 4 P. M.; hauled to the Westward again.
					P. M.	—.61	- 24		
	H. M. S. Jumna			3 A. M. came on to	3.	29.57		82	From 3 A. M to Noon running
	at 3 A. M.	8.59	85.34	blow from N.W. 5 West,	Noon	29.33		82½	from 9 to 12 knots to the S. S. W.
	Noon	10.28	85. 0	7 W. 8 N. N.W. 1 P. M.	3.——	29.21		82	5.30 P. M. hove to. 10h. 45'. Went
	3 P. M.	11.08	84.43	N. W. 3 N. N. W. and Calm to 4.15 P. M.; at Midnight hurricane from W. and S. W.	Midnight	29.16			over and cut away main mast.
1848. 24th April.	Braemar.	11.27	85.08'	2 A. M. South, 4 A. M. S. S. W. and increasing. Bar. rising at Noon.	3 A. M.	29.16			4 A. M. cut away mainmast. Forenoon; Hurricane slightly abating. Sea from all quarters. P. M. to mid. wind S. S. W. decreasing to strong breezes.
					4 ——	29.15			
	Sultany.	10.37	82.22'	A. M. Wind S. S. W. Noon strong breeze S. b. W	29.62 to 29.72 at Noon				
	Samarang.	10.37	82.22'	A. M. S. S. W. 6 A. M. S. b. W. Noon strong breeze S. b. W.	1 A. M.	29.62			Sea going down; 4 feet water in the hold. P. M. fine.
					Noon	29.72			
	Lady Sale.	10.44	81.24'	Fine Weather.					
	Futtle Rozack.	9.39	78.37'	Gradually becoming fine, Wind S. E. b. E.		29.60	29.22		4 P. M. heavy clouds to the S. E.

PART III.

I now proceed to state briefly the grounds upon which the tracks of these Cyclones are laid down on the Chart, beginning with that of the *Sir Howard Douglas.*

I have first given the logs of two vessels to the Eastward, the *Isabella Blyth* and *Wellesley*,* of which the first certainly had the rearward swell† of the advancing Cyclone on the 15th, when the outer circumference of its S. E. quadrant might have been at about 120 miles from her position; and Captain Baylis very truly conjectures from the "confused heavy swell from the Westward" which was that of the Cyclone, and the lesser swell from the Eastward which was occasioned by the Trade wind, that "it must have been blowing hard somewhere to the Westward" of his position.

The *Wellesley* it will be recollected, was also a homeward bound ship, but she was on the 12th in 10° 43' South and had then had the commencement of her gale since the 11th. As on the 12th she had the wind at N. N. W. which makes the centre bear from her W. S. W. it is difficult to suppose, without any intermediate evidence, that her Cyclone, if it was one, was the same as that of the *Sir Howard Douglas* on the 15th. I have therefore marked her track on the Chart rather as giving another laudable instance of the caution necessary in this dangerous tract of the Ocean.

We now come to the three ships near to which the centre must have passed between the 15th and 16th which are the *Sir Howard Douglas Admiral Moorsom*, and *Polly*, all of which had, by noon on the 15th, the Cyclone evidently commencing with strong gales from the S. E. and were running up to the Northward to cross in front of it, in entire ignorance of their danger in so doing. But of these three ships the position of the *Polly* is as we shall see altogether uncertain, and that of the *Admiral Moorsom* also, on the next day, is a mere estimation. Taking as nearly as

* A statement, from memory, by the master of the Barque *Iris* was also forwarded to me by Captain Twynham; but this vessel was on the 10th, in 12° South and 90° East when the weather became so suspicious as to induce Captain Twynham to believe he was passing near a Cyclone to the Westward of him, which indeed may have been the case, but it was not that of the *Sir Howard Douglas*; and as no Barometrical observations were made it is not certain even that it was a Cyclone. It might have been the *Wellesley's*.

† See Col. Reid's new work on Storms and the Variable Winds.

may be, a mean position for the centre of the Cyclone from the imperfect data given in the logs I should place it at this time in Lat. 9° 5′ S.; Long. 81° 55′ East; and as it passed a little after midnight close to the Northward of the *Sir Howard Douglas*, when she was upset, its rate of travelling may have been not quite 11 miles an hour, on a W. S. W. course. I have also marked the position of the *Sir Henry Pottinger*, as given by Captain Baylis, but as he does not say at what time on the 14th, nor with what wind she cut away her foremast, we can only infer that the Cyclone certainly came down from the E. N. E. as we have marked its track and that probably she was close to, or at its centre.

We then find that it passed close to the North of the *Polly*, and to the South of the *Admiral Moorsom* between 3 P. M. of the 15th and 5 A. M. of the 16th; though the positions of the vessels must be to some extent uncertain, as they were all running at night before a furious gale increasing rapidly to a hurricane; when all hands in a merchantman have full employment, and the log is usually marked the next day from recollection. We may infer that the *Sir Howard Douglas*' run is perhaps under-marked, for this direction of the track makes the centre pass at 33 miles distance from her, and from her log and low Barometer she may have been somewhat closer to it; judging also from the rapid veering of the wind with her after she went over.

After the track is carried past this group of vessels we have no farther data than the Log of the *Strabane*, which ship no doubt experienced the same Cyclone, for we see from Captain Anderson's well kept notes* that he was watching and noting the atmospheric indications on the 16th; and it is highly instructive to compare his remarks on the sea of the advancing storm with those of Captain Baylis of the *Isabella Blyth* in its rear, to see how perfectly good observers on opposite sides of the same Cyclone are warned of its approach or vicinity by these too-much-neglected signs.

The Log of the *Victoria* is so imperfect as regards position that we

* They are still but notes, and I should have been glad to have had the whole Log with them, for the point at which the track of the Cyclone crosses the ship's track is somewhat uncertain, because we have not her exact run, hour by hour to calculate with, but only the distance from noon to noon, whereas she was no doubt going much faster in the first than in the latter part of this twenty-four hours.

can make no use of it, farther than to say that it seems pretty closely to corroborate our estimation of the track; for from where she is marked in the Chart on the 15th (which is still but an approximate position) she had only to run down with the North Westerly gale which she must have had thereabouts, to plunge into and cross the track of the Cyclone in its rear as she evidently did. Her damage and narrow escape from foundering, as well as that of the *Sir Howard Douglas*, and the narrow escapes of the *Polly* and *Admiral Moorsom* from far worse loss than they suffered, are all instances of lamentable error; for they might all have escaped with a close-reefed-topsail breeze by heaving to for six hours, or if in the cases of the *Polly* and *Admiral Moorsom* they had thought it right, upon cool calculation, to risk crossing in front, they should have kept to the Westward far enough to maintain their Barometers without any farther fall, and even to raise them a little; without which their running was decidedly unsafe; and was indeed at no time worth the risk for the short amount of time and distance which it could have saved.

Returning to the details of the track: We find that noticing carefully the indications of the weather the *Strabane* ran up from Noon of the 16th to Noon of the 17th on a N°. 30° East course, so as to cross in front of the Cyclone and allow it to pass astern of her.* She had the wind about South at Noon, placing the centre (*if* the Cyclone had commenced) due East of her and veering to West and finally to "a furious gale" at N. W. at midnight; so that the Cyclone had passed just astern of the vessel in the interval between Noon and midnight.

As before noted we have not the exact run, neither have we the hours at which the winds were certainly at the points marked; so that we cannot exactly lay down the point at which the Cyclone's track crossed that of the ship, but as her position is carefully given, there is no doubt that, from that of the *Polly* and *Admiral Moorsom* the track

* Which however was done too closely for perfect safety; a North course or even one to the N. b. W. would have been a safer one, as carrying the ship more rapidly across the line of the track, which she would have possibly have done so as to run easily to the N. Eastward when the Westerly part of the vortex reached her. In questions like this however, all depends upon the point at which a vessel in a heavy breeze and sea steers best, and what the heave of the sea is.

curved considerably to the Southward and again to the North, to pass as it did so close to the South of the *Strabane*, so as to bring the wind from South to North West in 12 hours, and to depress her Barometer from 29.50 to 29.40.*

With regard to the rate of travelling we can only say that it seems evidently by the short duration of that part of the Cyclone which was of hurricane violence, and judging also from the estimated positions of the centres on the 15th and 16th, and midnight of the 16th and 17th that it cannot have been below 15 or 16 miles an hour. The rapid and sudden fall of the Barometers of the *Polly* and *Admiral Moorsom* within a short period shews that, for them, the more violent part was of limited extent but proportionably severe. The Barometer of the *Sir H. Douglas* did not indicate this peculiarity, but it may have been a more sluggish instrument.

A curious remark is made at the close of the *Polly's* Log, viz. that the observations between the 15th and 19th shewed that the ship must have been drifted *four degrees* to the Westward in the hurricane! Now this is scarcely possible, for the other ships would also have been carried to the Westward and no doubt have noticed it, to say nothing that the *hurricane* part of the storm did not last more than 24 hours at most, so that we must suppose here a storm wave of 10 miles an hour! which is quite unprecedented. I should rather suppose some error in the observations? or that the Chronometer had been injured during the Cyclone? We must not forget however that this throws much uncertainty on the *Polly's* position, and thus our track may not have been quite so abruptly curved as we have made it. Yet it is clear that we have yet much to learn regarding the tracks in this quarter of the Ocean; and such a one as is shewn by these ships' Logs *may* doubtless occur, and the Mariner has here another caution when a Cyclone is commencing with him.

The Jumna's Cyclones.

The following are the considerations upon which the track of these Cyclones are laid down.

* By a Barometer diagram which is sent with the extract the Barometer seems to have been at its lowest at about 3 A. M. of the 17th (probably an error) though the Log states it to have risen after midnight. The Simpiesometer both by the Log and diagram appears to have been lowest at about midnight.

We find, that on the 21st of April, the *Braemar* in 6° 43′ S. and 88° 10′ East had cloudy weather with a confused sea ; and the wind from N. E. to East, her Barometer being still at 29.77 ; and that the *Samarang*, *Lady Sale* and *Sultany* all very near each other, but 140 miles to the S. W. of the *Braemar* had also strong Northerly and N. Easterly breezes, increasing, and with squalls,and their Barometers falling ; and by midnight they were all preparing for bad weather. We cannot from this infer anything as to the existence of a Cyclone to the N. Westward of them on this day at Noon, and indeed had any existed it would have been felt by the *Jumna* and *Salween*, both of which were in that direction, the *Salween* being only 130′ to the W. b. N. of the *Braemar*.

But at 320 miles to the S. West of the *Braemar* and 180 to the S. West of the *Sultany*, *Lady Sale* and *Samarang*, it appears that the *Futtle Rozack* having had the wind in strong squalls from N. E. to E. S. E. and S. E. at Noon, had by 5 P. M. strong gales with heavy gusts, turbulent swell and confused sea, with her Barometer at 29.55 and 29.54. At midnight it did not fall more, because she was still running to the W. S. W. and S. W. and out of the Cyclone circle, if we take it now to have been one, as it seems by her Log to have just commenced, or formed, (or *descended*) somewhere to the N. W. of her.

It was midnight also before the *Pemberton* began to experience any bad weather. She being at this time perhaps with the light winds and calms described in the note, in about 7½° S. and 82° 50′ East, and indeed, if the winds are correctly noted in the newspaper account, which was no doubt the Captain's report, the Cyclone of this ship and the *Deborah* was a small one travelling rapidly to the S. East, a very unusual track hereabouts. I shall revert again to these vessels and I notice them now merely to shew that, for this day, the *Pemberton's* position could have no relation to the *Futtle Rozack's* bad weather. The newspaper position I take to have been as usual *about* where the gale was most severe, and Mr. Meldrum's to be the calculated position at noon of the 22nd, and that the date given by the Captain is that of the worst weather on the 23rd, when the vessel had drifted back to the Northward.

On the 22nd of April, we find that the *Braemar* had run down 160 miles to the S. S. W. and South with fresh gales and drizzling rain from the N. E. b. E. to N. East, and a high rolling sea ; her Barometer

falling from 29.74 at Noon to 29.54 at 4 P. M. The next ships to her are:—

The *Samarang* 200 miles to the W. S. W. with the wind about E. N. E. The *Sultany* about 130 miles to the W. b. S. and the *Lady Sale* about 115 miles to the W ½ S. with the wind about E. N. E. and these vessels had all by noon gales, or every indication of bad weather. The note of the *Deborah* affords us no information as to the weather on the 22nd, and the *Pemberton's* has no position. As however, both these vessels were from Bombay we may take them, like the *Jumna*, to have been running down to the S. b. W. or S. S. W. at most, to get the trade wind as soon as they could. The bearings of the centre from the ships *Samarang*, *Sultany* and *Lady Sale* will not cross so as to meet at any point near enough to assume it as a centre, and if the centre was at all distant the circle would include H. M. S. *Jumna* and the H. C. P. V. *Salween*. And we know of the first that she "had the usual fair (westerly) winds with heavy squalls thunder and lightning" till the 23rd of April, and of the *Salween* at 170 miles to the N. N. W. of the *Braemar*, that though, as with all the ships, she had very threatening appearances, yet it was fine enough to allow her to speak the *Jumna*.

Hence we may suppose that, if the Cyclone was formed at Noon of this day, it was only so overhead, and was settling down: perhaps unequally; i. e. with its S. Eastern and Southern quadrants more inclined to the earth than the Northern and North Western ones; or that the Westerly Monsoon was still strong enough to the Northward to force its way beneath and impede the due surface action of that side of it. I do not mean as regards the wind, but as regards its electric action. The mere winds only would have assisted each other, both being from the Westward. We cannot thus fairly assign any centre to this Cyclone for the 22nd.

We find that the *Futtle Rozack*, which ship on the 21st had every indication of a Cyclone to the Northward and Eastward of her, ran on to the S. W. with the S. Easterly gales of its S. West quadrant till her Barometer fell to 29.48; and at 10 A. M. bore up to the N. W. to get out of it, bringing the wind to S. S. E. at 5 P. M. and to S. ½ East and S. east at midnight, so that we may suppose, with so accurate an observer as Captain Rundle, and the full detail of his careful obser-

vations that there really was a smaller precursor Cyclone in his wake as he supposes, on the 21st and 22nd, and that it passed near to the *Hardwicke* by the imperfect newspaper notice which I have obtained, that ship being only 25 miles to the South a little East of the *Futtle Rozack*.

On the 23rd of April.—Taking the ships now from the Westward* we see that the *Deborah* had on this day a small Cyclone centre crossing her which is called a hurricane, and lasted for four hours only. It is difficult to say from such scant information if this had any relation to the next ship's hurricane, the *Pemberton*, which appears from Mr. Meldrum's account to have had the centre of the Cyclone passing over her not far from the spot of which he has given the Lat. and Long. on the 22nd, but as we are quite in the dark as to whether she was running or hove to; and as the copy of his letter sent me from Bombay differs from the newspaper report, we can merely take the whole as a *sort* of confirmation, but nothing else. The shift given by the newspaper report, N. N. W. to W. S. W. would also give a Cyclone track to the S. E. like that of the *Deborah*; and as the *Pemberton* was a cotton-laden ship bound to England, she probably ran on as long as she could do so under the temptation of the fair wind from N. N. W. I should take the *Deborah's* to be a separate Cyclone of small dimensions, but it is scarcely possible to trust to these scant, and so frequently erroneous newspaper notices.

We have next the Log of the *Lady Sale*, but unfortunately her positions are only given on the 21st and 24th, and the extract from her log giving no distances run, or rate of drift, I cannot work up the dead reckoning. We can only then estimate roughly that as her track and drift cross that of the Cyclone, and as she was evidently hove to close on the western verge of the centre at 4 P. M. on the 22nd, she had probably run down about 200 miles from her position on the 21st before she hove to; which would place her at that time, i. e. 2 A. M. 23rd, in Lat. 9° 44′ S.; Long. 83° 43′ East, when, as the wind is marked due East in her log, she had the centre North from her, and between this time and noon of the 23rd the centre, as we see from

* Because from the shifts given in the notices of the *Deborah*, *Pemberton* and others, N. E. *to* S. W., it is clear that their Cyclone was travelling *to the S. Eastward!* a very unusual track, but one fully shewn to be correct by all the Logs.

the veering of the wind, was passing her close to the N. Eastward while she was hove to; the Cyclone leaving her with a strong breeze only, from the Southward, by noon of the 23rd, when she might be about 172 miles West from the position of H. M. S. *Jumna* at that time, which would give about 150 miles for the semi-diameter of the Cyclone taking the *Jumna* to have been at noon close on the eastern verge of the centre.

The next ship, and she must have been not far from the *Lady Sale*, is the *Samarang*. We find that her Easterly gale had increased to a hurricane from E. b. N. by 8 P. M. of the 22nd; and that at midnight her Barometer had fallen to its lowest, 29.39, with the wind about E. S. E. veering to South at 8 A. M., and moderating with the Barometer at 29.50 by Noon. Hence it is clear that the centre passed her to the Eastward, and if we take the average strength and shift of the wind to have been from E. N. E. when it is described on the 22d as an increasing gale, obliging the ship to be hove to, to South, this would give a S. E. b. E. course for the body of the Cyclone.

We have then the *Sultany* to the N. Eastward in about 9° 32′ S.; and about 83° 27′ East, or not quite midway from the *Pemberton* and *Deborah*, a little more than 100 miles N. E. of the *Lady Sale*, and not quite 100 miles N. West of the *Jumna;* and we find that at noon, in about this position, she must have been *at* the centre since she had "the wind all round the compass with a dreadful sea and thick dense atmosphere, the vessel lying with her lee gunwale in the water."*

H. M. S. *Jumna*, to which we now come, has her position also as well ascertained as that of vessels can be in weather of this nature, and so far better than the *Sultany's* that the *Jumna* was going free and the *Sultany's* drift only can be estimated. We see that she was at the distance of 98 miles to the S. E. b. East of the *Sultany*, which would have given her *if she had the same Cyclone* a N. E. b. N. wind, instead of which we find she had one to the Westward of North that is N. N. W.! at Noon, or one differing five points. This is not reasonably reconcileable and we may either suppose that H. M. S. *Jumna* had a smaller Cyclone travelling down with her, in her run on this day, and that it was about the spot where the *Sultany's* and

* The *Sultany* is one of the finest ships out of the Port of Calcutta, of 1000 tons burden, and ably commanded. We see that she was fully prepared for the hurricane, though from its unusual track she was involved in it.

Jumna's Cyclones met that the latter vessel was upset, or that there were some excessive incurvings of the winds with her at this distance from the centre.*

For we find by the *Jumna's* Log that she had the usual fine and squally weather up to 3 A. M. on the 23rd, when it came on to blow from the N. West; and at 5, veered to West; at 6, to W. N. W.; and at ½ past 8, to Noon it was N. N. W. and P. M. N. b. W.

Now the *Sultany* before, and up to Noon, had her Cyclone to the N. W. of her position, and though it is true that a storm circle which would include the *Braemar* and *Mary Stoddart*, both of which ships had a full hurricane on the 23rd, would also include the *Jumna's* position and run, yet it is difficult to allow so great a discrepancy in the position of the centre as denoted by the wind points shewn above; and this is farther strengthened by the fact that the winds on board the *Jumna*, though marked most carefully (nine times in the 24 hours on the 22nd, and twelve times in the Log of the 23rd), are never to the Eastward of North; which we certainly must suppose they would sometimes have been if the bearing of the centre had been so far to the North Westward of the *Jumna* as the *Sultany's* position, whether over or under-stated, shews. We may also remark that even *at* the calm centre and close upon it the *Jumna's* Log shews only vibrations of two points till the wind finally settled at S. W. after the shift.

Thus we are reduced to the first supposition, which is that the *Jumna* was bringing down with her another small Cyclone, and if we admit this, and that it was for a time travelling on a track gradually approaching her as shewn by the steady fall of her Barometer, we can easily understand that at the point where the two approximated and combined, the fury of the tempest might be much augmented and the track subject to some variation.† I proceed to examine the *Jumna's*

* Five points is not an excessive incurving of the wind when *near* the centre, but at this distance it would seem to be so. See Sailor's Horn Book, pp. 70 to 75, on the incurving of winds. The wind was of course accurately marked on board of the Man-of-War, and I do not recollect that we have any detailed Log of a Man-of-War in recent days in the Eastern Seas in an open Ocean. Those of H. M. S. in the China Seas cited in my Seventeenth Memoir are all within a short distance of the land.

† This certainly occurs with hail storms, as satisfactorily shewn by the Count de Tristan in the Annales de la Societé Royale d'Orleans. See Quarterly Journal of Science for 1829, p. 214.

Log more closely so as clearly to set forth the reasons on which this opinion is founded. We shall find moreover that the *Braemar's* Cyclone was a separate one from those of the *Jumna* and *Sultany*.

First: we have her position at 3 A. M. of the 23rd as marked on the chart when it "came on to blow." The wind is marked at *N. W.* in the Log* and West at 5 A. M. though the copy of Lieut. Rodney's Admiralty letter forwarded to me by H. E. the Naval Commander-in-Chief, says "a heavy gale sprung up *at North*, veering at times to N. N. W." This is, at starting, a troublesome discrepancy, but I reconcile it by supposing that North *West* was written at full length in the letter and the word *West* omitted by the copying clerks; for it is difficult to suppose that three copies of the Log by different hands are all in error. The wind is also marked N. W. from 9 P. M. to midnight on the 22nd. The Barometer at 29.64 at midnight 22nd and 29.57 at 3 A. M. 23rd; and the wind increasing from a force of 5 to 7 and 8.†

Hence we may say that the *Jumna* had a sudden onset of a fresh gale, at N. W., giving her a centre bearing S. W. of her at 3 A. M.; which by 5, when she had run 27 miles to the South and S. S. W., was bearing South of her (wind West) and in a run of 14-4 miles it was bearing S. S. W. of her, (wind W. N. W.) and in a run of 43 miles more, it was bearing W. S. W. of her, (wind N. N. W.)

We can only account for these excessive veerings by attributing them either to incurvings of the winds or to the action of a smaller Cyclone‡ travelling down with the ship, I prefer the latter hypothesis, and have therefore placed upon the chart a separate diagram upon a plane scale shewing the *Jumna's* run, and the various bearings of the Cyclone centre from her at different hours, with the height of her Barometer.

* Three copies in all.

† Admiral Beaufort's Numbers. 5 is a fresh breeze, 8 a fresh *gale*.

‡ Of which we may suppose the centre to have had that spiral motion upon itself during its progress described by Mr. Redfield, making thus the meandering track which I have laid down in the diagram; and even that these deviations from a direct line of track were occasioned by the alternate attractions and repulsions of the larger (*Sultany's* and *Braemar's*) Cyclones on each side of it, as with other electrified masses. It is evident that the three cannot be reconciled as one Cyclone till about the time of the *Jumna's* being dismasted. There is indeed one other, but a remote suspicion: namely, that her compasses may have been affected?

H. M. S. now ran down with the wind N. N. W. and N. b. W. till 4 P. M. when she reached the calm centre, but the Cyclone following her and probably before this time combining with the *Sultany's* and *Braemar's* gave her a renewed hurricane at W. S. W. and S. West, when unable to lie to any longer she bore up, with the wind now blowing harder than the figure 12 expresses, *though it had only been rated at* 10 *before the calm.* This average shift of N. N. W. to S. W. would give a track of E. S. E. for the body of the Cyclone at this time, though as compared with the position of the *Sultany*, not far from which one of the main Cyclones had certainly travelled down to reach the *Jumna's* here, the track should have been one from the N. W. b. N. to the S. E. b. S. so that if there was a junction of the three Cyclones as we have supposed, the track of the larger one was curved towards the smaller. The *Jumna* scudded before the S. W. hurricane till 10h. 45′ P. M. when broaching to, she upset and was only saved from foundering by cutting away her mainmast. It is remarkable also that her Barometer was now lower, being at 29.16, than in the calm, when it was at 29.21. Was this an effect of the meeting of the *Braemar's* Cyclone?

The Cyclone *may* indeed have curved farther to the Eastward, as we shall now see on consideration of the *Braemar's* Log, which, I should premise, is one very well kept, and evidently worthy of all the credit which can be fairly accorded to a merchantman's Log in comparison with that of a Man-of-War. This ship then, on the 22nd at Noon, though her Barometer was still high had fresh gales at N. E. with drizzling rain and a high rolling sea, which was no doubt the commencement of her Cyclone, for at 8 it was "increasing with heavy seas* from the N. West, S. E. and S. W." obliging her to close reef; the Barometer having fallen to 29.54 by 4 P. M. and standing at 29.58 at midnight. Hence it would appear that she had at Noon a Cyclone to the N. W. b. N. of her (wind N. E. b. E.) and that at midnight its centre bore N. West of her, the wind being N. E., so that though she had run 46½ miles S. S. W. and 37 miles South, the Cyclone had travelled down nearly with her like the *Jumna's*. I have projected these circles but in part only, so as not to interfere with those of the *Jumna's* track, though it must be recollected that at midnight 22nd and

* The precursor swells of the Cyclone.

23rd, the centre of the *Braemar's* Cyclone is about 100 miles to the South of the *Jumna's* probable position at the same time. And this too serves to shew that, like the *Jumna's* Cyclone, that of the *Braemar* was also of small extent, for had it been large it would have reached the *Jumna* at this time with its northern quadrants, giving her a N. Westerly gale of the same force; and that at noon of the 22nd the *Jumna* could not have been far from its centre if it had existed; whereas we find that she had at that time Northerly and variable winds (force 6) with cloudy weather, and it was not until 15 hours afterwards 3 A. M. 23rd, that it "came on to blow."

There can be no doubt, also, that the *Braemar's* Cyclone travelled down nearly with her, i. e. from the N. N. E. to the S. S. W.; for as from noon to midnight of the 22nd, she made a chord of 95 miles this would have given her a very considerable veering of the wind had the Cyclone been coming direct towards her.*

At 8 A. M. there is the remarkable note in the *Braemar's* Log of "gale suddenly increasing," and the Barometer had fallen at Noon to 29.45, from 29.58 at midnight; and we find that at 9 A. M. the wind with the *Jumna* veered from W. N. W. to N. N. W. increasing in strength from 9 to 10. We may take this, I think, to be about the time of junction of the two, or of the three Cyclones, as that of the *Jumna* now seems to have adopted a steady course to the Southward as if it had been before attracted and repelled between the *Sultany's* and the *Braemar's*, which accounts for its serpentine track as shewn in our diagram. The land whirlwinds and simoons certainly make tracks of this kind, and in hail storms and thunder storms clouds are sometimes seen attracted and repelled between two others. So that on the supposition that the Cyclone is an electrical phænomenon, there is nothing at all strange in this track of the *Jumna's*, and we may think ourselves very fortunate that we have so many Logs and notices to explain it.

The main Cyclone evidently after this time, (Noon 23rd) passed to the Northward of the *Braemar;* which ship was probably carried

* A Cyclone of 100 miles in diameter requires in round numbers a run of 10 miles for each point which the wind veers; one of 200 miles about 20′, so that the *Braemar's* Cyclone could only be travelling parallel to her, and at about her own rate.

first to the South Westward and then back to the Northward by her drift and the storm currents; being so near the centre as to have the wind veering from E. N. E. to S. E. blowing a hurricane at midnight when H. M. S. *Jumna* was also in the adjacent quadrant running out of the circle, with her foremast only standing since 10h. 45′ P. M. From the direction of the wind—and taking also into account the little attention which *can* be paid to a merchantman's Log on the approach of bad weather, so that it is very often undermarked, it would seem that the *Braemar* must have been much farther to the Southward than her Lat. and Long. by D. R. place her, but I have not thought it right to alter her position on a mere probability. There can be no doubt that she was close on the Southern and S. Western quadrants of the centre both from the rapid veering of the wind and its extreme violence, obliging her at 3 A. M. of the 24th to cut away her mainmast.

From the Log of the *Mary Stoddart*, there is nothing to be gleaned except that she had also a Cyclone *thereabouts** travelling to the South Eastward. The notice of the *Ormelie* may relate either to a heavy Westerly monsoon gale or to the Northern quadrants of the *Mary Stoddart's* Cyclone.

As the phænomenon of the vibrating track of the *Jumna's* Cyclone as marked on the chart is of much importance in our science if we allow that it really took place as I have endeavoured to shew, I have thought it right to print also the Log at full length; or rather *a* Log compounded of the three separate ones in my possession by filling up in Lieut. Rodney's Log of the weather, Bar. and Ther. the distances. I have no Log enabling me to give the run on the 22nd, or afternoon of the 24th, but this is immaterial.

I have noted carefully where discrepancies occur, but fortunately in all the main points as regards the veerings of the wind they all agree, and it is this alone which is of interest to this part of the investigation. The remarks of the Log I have condensed with the abridgement in Part II.

* For, to add to our perplexities with these scant notices, some Captains give the Latitude and Longitude of their position when they consider the hurricane to have *begun* with them, and others their position when it is at its utmost fury; so that a hurricane *in* such a position means at either of the above times! and the two positions may be at any distance apart.

An extract from the Log of H. M.'s Brig " JUMNA," *shewing the state of the weather, Barometer, and Thermometer between the 22nd and 24th April,* 1848—*from* LIEUT. RODNEY, *Trincomalee: the distances on the 23rd and 24th, also from the official copy of the Log.*

Hours.	*Courses.*	*Winds.*	*Force.*	*Weather.*	*Bar.*	*Ther.*	*Saturday 22nd April,* 1848.
1	South	Variable	3	c. n. e.			A. M.
2							
3							
4		N. W.	4	c. p.	29.72	82°	
5							
6		West	5	c. q. m.			
7							
8			5	c. q. 8	29.74	82°	Squally.
9							
10		North	6	o. c. q. r.			
11							
12				b. c. q.	29.73	82°	
1		Variable	6	o. p.			P. M.
2	S. W.						
3			6	o. r.			
4		North			29.62	82°	
5							
6	S. S. W.						
7	S. W. ½ W.	West	6	c. r.			
8	S. S. W.	W. N. W.			29.66	83°	
9		N. W.	6	o. q.			Very squally.
10							
11							
12			5	o. r.	29.64	82°	

Hours.	Courses.	K.	F.	Winds.	Force.	Weather.	Barometer.	Thermometer.	Sunday 23rd April, 1848.
1	S. S. W.	9	0	N. W.	6	c. q. r.			A. M.
2		9	0						
3		9	0						
4	South / S. S. W.	3 / 5	5 / 0		7 / 8		29.57	82°	
5		9	4	West					
6		9	4	W. N. W.*					
7		10	5		9				
8		12	0				29.53	82½°	
9		11	5	N. N. W.†	10	o. q. g. p.			
10		11	5						
11		10	0						
12		11	5				29.33	82°	
				Lat. D. R. 10° 28′ S.			*Long. D. R.* 85° 00′ E.		
1	S. S. W.	13	0	N. b. W.	10	o. q. g.	29.33	82°	P. M.
2		13	0				29.31	82°	
3		10	8	N. N. W.	9	o. q. g.			
4	South	6 / 3	0 / 2	Calm	7 / 0		29.21	82°	Wind increasing.
5	S. b. W.	6	0	W. S. W.	6				
6	S. b. E.	2 / 3	8 / 3	West	7 / 6	o. q. r.	29.19	82°	
7		3	0	S. W.	9				
8		3	0	W. b. S.	10		29.18	82°	
9	S. b. E. / N. E.	2 / 5	2 / 0	S. W.	10	o. q. g.	29.16	82°	
10		11	0		11	o. q. g.	29.18	82°	
11		14	0		10 / 12		29.16	82°	
12		14	0		12		29.16	81°	

* Wind W. N. W. is marked at 5, ½ past 5 and 6.

† Wind N. N. W. is marked at 9, 10 and 11 A. M.

Hours.	Winds.	K.	F.	Courses.	Force.	Weather.	Barometer.	Thermometer.	Monday 24th April, 1848.
1	S. W.	14	0	N. E.	12	o. q. l. t.	29.16	81°	A. M.
2	S. W. b. S.	14	0	N. E. b. N.					
3		14	0				29.18	81°	
4	S. S. W.	14	0	N. N. E.	11	o. q. r.	29.16	81°	
5	S. W.	5	0	N. E. b. E.	8	o. q.	29.18	82°	
		1	5	E. b. N.	6				
6		2	0		3		29.22	82°	
7		1	0		4		29.24	82°	
8		2	5	N. E.			29.27	82°	
9		1	5	N. N. E.			29.37	82°	
10		1	5				29.40	83°	
11		1	0						
12		1	0	*	4		29.42	83°	
1	N. W.			N. b. E.	5	o. q. g.			P. M.
2	W. N. W.								
3							29.63	82°	
4									
5	West			N. b. E.	1	o, r, n.			
6				North					
7				N. b. E.	6	o. q.	29.62	82°	
8									
9									
10									
11				North.			29.71	82°	
12	W. ½ S.				1	o. q.			

* No farther distances are in my possession.

CONCLUSION. We may first remark here, as regards the practical part of the results, that in both the Cyclones of which we have investigated the tracks, the single one of the *Sir Howard Douglas* and the triple combination of those which I have for brevity's sake called the *Jumna's*, *all* the ships which suffered did so from their neglect or ignorance of the Laws of our Science, for they had nothing to do but to heave to for a few hours! And again, as if they had all been performing experiments for the instruction of their brother seamen, the whole of them in the first Cyclone, the *Sir Howard Douglas*, *Admiral Moorsom*, and *Polly*, ran into the Cyclone circle from the South, the fair S. E. wind of the South Western quadrants tempting them to do so; and all those in the other Cyclone were doing the same on the opposite quadrants of their Cyclones, and exactly from the same temptation. And this it will be observed was constantly done in the face of their falling Barometers! It is I know very difficult for seamen to bend their minds to the notion of "*throwing away a fair wind because they are* AFRAID *of a hurricane*," but we might also urge upon them that they may be creditably afraid of the displeasure of owners and underwriters, and of ruin to their own prospects, when the Barometer so clearly warns them that mischief is impending.*

As regards the theoretic or rather the physical branch of our enquiries we have arrived here at some very curious facts.

First, the tracks from the N. Westward and N. Eastward are corroborated by and corroborate those of the H. C. S. *Orwell* and *Macqueen* in 12° S.; and 100° to 104° East in January and February, 1827, which I have laid down on the Chart of the Tracks of the Southern Indian Ocean in the Sailors' Horn Book, (marked *i.* and *f.*) as well as some others farther East in the Timor Sea, shewing that just on the

* The Ship *Sir Howard Douglas*, dismasted and with loss of rudder being bound to Bombay with a cargo of coals, got into Galle, from whence she again started for Bombay; but while endeavouring to get round by the Southern passage, her coals heated, 95 days after being wetted in the hurricane! and she bore up for Calcutta where she had of course to be docked. She then went to Moulmein for a cargo of timber, where Captain Ogilvy, whose mind, as I saw, was much depressed by his misfortunes, died. The ship I presume reached home in safety, but the accounts of the voyage must have shewn a fearful loss for some one. All this might have been avoided by heaving to, at 6 P. M. for 6 hours!

verge of the Westerly monsoon and trade wind limits, great variation in the tracks is to be looked for.

Next, the serpentine course of the *Jumna's* hurricane most remarkably approaches to what we have upon record in various works describing the tracks of Tornadoes and land-spouts or whirlwinds (many of them evidently electric by their effects) and hail-storms. And the Comte de Tristan* has satisfactorily shewn in treating of this last class of phænomena, and of thunder-storms, that their clouds attract and cause each other to deviate from their route; often appearing stronger afterwards. We require farther evidence to affirm *certainly* that this occurs with Cyclones, but there are now strong probabilities that it does; and our present knowledge will serve to put the careful seaman on his guard till more is obtained, and afford many suggestions for intelligent observers.

Finally: all this we see occurs in the Storm Tract to which I have so often and so earnestly drawn the attention of mariners navigating the Indian Seas, and in which indubitably so many fatal losses and so much damage have occurred. And it must be now evident to the most reckless that no ship can be too well prepared which has to cross these dangerous latitudes.

* Annales de la Societé Royale d'Orleans, before quoted p.

On the Dust-storms of India. By P. Baddeley, Esq. B. M. S., Surgeon Arty. Lahore.

(From the Philosophical Magazine and Journal of August, 1850.)

The Editor reprints this paper with great pleasure; not only as another of those triumphs of Indian research which have so often adorned the pages of the Journal, and so well demonstrated to the scientific world what the energy of English minds alone can perform, under all the discouragements and difficulties which the experimental sciences, particularly, must meet with at every step in a state of Society so peculiar as that of India, but moreover as a solution of a great meteorological problem which opens a new page of the Book of Nature in that vast and yet unwrought mine of science. We trust that Dr. Baddeley will continue his valuable researches in the great field which he has before him.—Ed. Jour.

Lahore, April 18, 1850.

Gentlemen,

I have only an hour or two to spare before the Indian mail leaves this, to give you a few notes regarding dust-storms, which are very prevalent in this part of India during the dry months of April, May and June, that is, before the setting in of the rainy season.

My observations on this subject have extended as far back as the hot weather of 1847, when I first came to Lahore, and the result is as follows :—Dust-storms are caused by spiral columns of the electric fluid passing from the atmosphere to the earth ; they have an onward motion—a revolving motion, like revolving storms at sea—and a peculiar spiral motion from above downwards, like a corkscrew. It seems probable that in an extensive dust-storm there are many of these columns moving on together in the same direction ; and during the continuance of the storm, many sudden gusts take place at intervals, during which time the electric tension is at its maximum. These storms hereabouts mostly commence from the north-west or west and in the course of an hour, more or less, they have nearly completed the circle, and have passed onwards.

Precisely the same phænomena, in kind, are observable in all cases of dust-storms : from the one of a few inches in diameter to those that extend for fifty miles and upwards, the phænomena are identical.

It is a curious fact that some of the smaller dust-storms occasionally seen in extensive and arid plains, both in the country and in Affghanistan above the Bolan Pass, called in familiar language " Devils," are either stationary for a long time, that is, upwards of an hour,

or nearly so; and during the whole of this time the dust and minute bodies on the ground are kept whirling above into the air. In other cases these small dust-storms are seen slowly advancing, and when numerous, usually proceed in the same direction. Birds, kites and vultures, are often seen soaring high up, just above these spots, apparently following the direction of the column, as if enjoying it.* My idea is, that the phænomena connected with dust-storms are identical with those present in waterspouts and white squalls at sea, and revolving storms and tornadoes of all kinds; and that they originate from the same cause, viz. moving columns of electricity.

In 1847, at Lahore, being desirous of ascertaining the nature of dust-storms, I projected into the air an insulated copper wire on a bamboo on the top of my house, and brought the wire into my room, and connected it with a gold-leaf electrometer and a detached wire communicating with the earth. A day or two after, during the passage of a small dust-storm, I had the pleasure of observing the electric fluid passing in vivid sparks from one wire to another, and of course strongly affecting the electrometer. The thing was now explained; and since then I have by the same means observed at least sixty dust-storms of various sizes, all presenting the same phænomena in kind.

I have commonly observed that, towards the close of a storm of this kind, a fall of rain suddenly takes place, and instantly the stream of electricity ceases, or is much diminished; and when it continues, it seems only on occasions, when the storm is severe and continues for some time after. The barometer steadily rises throughout. In this part of the world, the fluctuation of the barometric column is very slight, seldom more than two or three tenths of an inch at a time.

The average height at Lahore is 1-180, corrected for temperature, indicating, I suppose, above 1150 feet above the level of the sea, taking 30 inches as the standard.

A large dust-storm is usually preceded by certain peculiarities in the dew-point, and the manner in which the particles of dew are deposited on the bulb of a thermometer. My mode of taking the dew-point is, to plunge a common thermometer in a little ice, let it run down 20° or

* They may be looking for prey, or involved in, and unable to fly out of, the invisible part of the electrified aerial column, of which the lower part only is visible to us by the dust raised.—Ed. Journal.

30°, take it out, wipe it dry, hold it up to the light, and observe the bright spot, and continue to wipe off the dew so long as it is deposited and dulls the bulb: at the instant it clears off mark the temperature. This I have compared frequently with Daniell's hygrometer, cooled by means of chloroform, and find them both correspond with the greatest accuracy.

This is a digression; but I have no time to arrange, and must therefore put down my remarks as they occur to me.

The dew-point varies very much, but is usually many degrees below the temperature of the air, 20° to 50° or more.

It also varies according to the time of year. During November last the mean temperature of the dew-point was about 47°, that of the air about 71°.

In January 1850, dew-point 43°; in the air, 61°; and the mean temperature of self-registering thermometer 45°·4.

In February 1850, mean of dew-point 48°, and air 64°·5.

April 1850, mean temperature of dew-point so far, is about 60°, and the air 84°.

The sparks, or the stream of electricity, as it is seen passing from one wire to the other, is in some cases, and during high tension, doubled or trebled; and is never straight, but invariably more or less crooked.

Various kinds of sparks are seen; at times one end of the wire has a star; and from the wire, when held just beyond striking distance, a brush is seen curved, which, when viewed through a lens, seems composed of a stream or curved brush of bright globules, like a shower of mercury.

The manner in which the electricity acts upon the dust and light bodies it meets with in its passage, is simple enough. I suppose the particles similarly electrified and mutually repulsive, and then, together with the whirling motion communicated to them, are whisked into the air. The same takes place when the electricity moves over water. The surface of the water becomes exposed to the electric agency; and its particles, rendered mutually repulsive, are in the same way whirled into the air.

At sea the waterspout is thus formed. First of all is seen the cloud descending, and beneath may be observed the water in a cone, misty

and agitated; soon the cloud is seen to approach and join the latter, involving both extremities in one column having a spiral motion, and on it moves or continues stationary. The power of electricity in raising bodies, when combined with this peculiar whirling motion, will account for fish, &c. being carried up in its vortex and afterwards discharged to a distance on the earth. The motion of the dust-storm may be described by spinning a tee-totum on a drop of ink; and the way in which bodies are projected may be in like manner described, by letting fall a drop of ink on the centre of a tee-totum while spinning. In this case the particles of ink are thrown off at tangents ever varying, as the centre moves; and perhaps it will be found, that when these kind of storms pass through forests, trees uprooted are distributed something in this manner.

The violent dust-storms are by some supposed to commence at the foot of the hills. I cannot tell if this be the case or not, but should think that they do not necessarily do so, as many often originate in extensive arid plains; and the rarefaction of air, from great and long-continued heat, may be in some way connected with the exciting cause.

Some of them come on with great rapidity, as if at the rate of from 40 to 80 miles an hour. They occur at all hours, oftentimes near sunset.

The sky is clear, and not a breath moving; presently a low bank of clouds is seen in the horizon, which you are surprised you did not observe before; a few seconds have passed, and the cloud has half filled the hemisphere: and now there is no time to lose—it is a dust-storm, and helter-skelter every one rushes to get into the house in order to escape being caught in it.

The electric fluid continues to stream down the conducting wire unremittingly during the continuance of the storm, the sparks oftentimes upwards of an inch in length, and emitting a crackling sound; its intensity varying with the force of the storm, and, as before said, more intense during the gusts.

Many dust-storms occur at Lahore and in the Punjaub, generally during the hot and dry months, as many as seven and nine in one month.

One that occurred last year in the month of August seemed to have

come from the direction of Lica, on the Indus, to the west and by south of Lahore, and to have a north-easterly direction. An officer travelling, and at the distance of twenty miles or so from Lica, was suddenly caught in it; his tent was blown away, and he himself knocked down and nearly suffocated by the sand. He stated to me that he was informed by one resident at Lica, that so great was its force at the latter place, as to crack the walls of a substantial brick dwelling in which the above officer had lately resided, and to uproot some trees about.

The instant the insulated wire is involved in the electric current marked by the column of dust, down streams the electricity.

I have sometimes attempted to test the kind of electricity, and find that it is not invariably in the same state; sometimes appearing +, at other times –, and changing during the storm.

One day I caused the current to pass through a solution of cyanide of silver, so as to affect a small piece of copper, which was rapidly covered with a coating of silver, which upon drying peeled off. In this case the cyanide of silver was pure, without any salt; but in subsequent attempts to silver a wire in this way, I have not succeeded, only a very slight deposit taking place, which was not increased by long exposure to the influence.

But in all the cases I tried subsequent to the one first alluded to, the oxide of silver was dissolved in cyanide of potassium. In the course of time bright and minute crystals were formed, transparent and colourless, on a copper coin. Yours truly,

P. Baddeley,
Arty. Surgeon, Lahore.

Tables for determining Heights by the Barometer. Computed by Major J. C. Hannyngton, *B. N. I.*

These tables are so framed as to bring the logarithmic process into a purely arithmetical and very simple form.

They are to be used as follows:

Rule. Correct the Barometer at the *colder* station, by *adding* the correction from Table I. for the *difference* of temperature.

Extract the Barometric Factors from Table II., then according as the Barometer at the *lower* station is more or less than 30 inches, multiply the sum or difference of these Factors, by the Factor for the *sum* of the temperatures from Table III. The result will be the difference of altitude in feet.

Where great accuracy is desired a small correction for the approximate Latitude of the place may be applied from Table IV. This is to be added to or taken from the computed height, according as the Latitude is less or more than 45°.

		Barometers.	*Thermometers, attached.*	*detached.*
Example I.	Calcutta, ...	30.131	87	86
	Hazaribagh, ...	28.019	78	77
			Diff. 9	Sum 163

Barometer at the *colder* station,..	28.019	
Correction Table I. for Bar. 28, and Diff. 9, ...	.028	
	28.047	Factor Table II. 29.23
Barometer Calcutta, ...	30.131	,, 1.89
		Sum of the Factors, 31.12
Sum of Thermometer 163°.		Factor from Table III. 66.98

24896
28008
18672
18672

Product, Hazaribagh above Calcutta, in feet, 2084.4176

Here it will be observed that the Barometer at the *lower* station *exceeds* 30 inches; therefore the *sum* of the Barometric Factors is used. The Latitude of Hazaribagh being 24° and the elevation 2000 feet, it appears from Table IV. that 3 feet may be *added* to the above result.

		Barometers.	*Thermometers. attached,*	*detached.*
Example II.	Lake,.....	29.950	50	49
	Mountain,.....	27.474	44	45
			Diff. 6	Sum 94

Barometer *colder* station,.....	27.474		
Correction for 6° Tab. I.	.017		
	27.491	Factor Tab. II.	37.93
Lake,.....	29.950	,,	0.72
		Difference of the Factors,....	37.21
		Sum of Thermometers 94°. Factor Tab. III. ..	62.36
			22326
			11163
			7442
			22326
		Product, difference of altitude in feet,.....	2320.4156

Here the Barometer at the *lower* station is *less* than 30 inches, therefore the *difference* of the Barometric Factors is used. The Latitude being 55° it appears from Table IV., that 2 feet may be subtracted from the above result.

Note on the construction of the Tables.

Let T and T′ be the temperatures of the mercury ; t and t′ those of the air, h and h′ the heights (after reduction by Tab. I.) of the Barometers, at the lower and upper stations, and λ the latitude of the place. Also let H express inches of the Barometrical column generally ; then,

Table I. $H \frac{T \backsim T'}{9600}$, being the correction of the Barometer for the expansion or contraction of mercury, depending on temperature. Which correction, being applied to the *colder* Barometer, is additive.

Table II. 1000 (209 30—209 H), and consequently the sum or difference of the tabular quantities taken for h and h′ is equivalent to 1000 (209 h—209 h′) ; five figure logarithms being used.

Table III. $60.345 \left(1 \pm \frac{t + t' - 64}{900}\right)$.

Table IV. .002695 Cos 2 λ.

The result of the tables is therefore,

$$\text{Difference of level in feet, } (209\,h - 209\,h') \Bigg\} \frac{60345}{1 \pm .002695 \text{ Cos } 2\lambda} \left(1 \pm \frac{t + t' 64}{900}\right)$$

TABLE I.—*Correction of the Barometer for temperature.*

Difference of the Thermometers.	*Barometer Inches.*									Difference of the Thermometers.
	14	15	16	17	18	19	20	21	22	
	Correction to be added to the colder or subtracted from the warmer Barometer.									
0	.000	.000	.000	.000	.000	.000	.000	.000	.000	0
1	.001	.002	.002	.002	.002	.002	.002	.002	.002	1
2	.003	.003	.003	.004	.004	.004	.004	.004	.005	2
3	.004	.005	.005	.005	.006	.006	.006	.007	.007	3
4	.006	.006	.007	.007	.008	.008	.008	.009	.009	4
5	.007	.008	.008	.009	.009	.010	.010	.011	.011	5
6	.009	.009	.010	.011	.011	.012	.012	.013	.014	6
7	.010	.011	.012	.012	.013	.014	.015	.015	.016	7
8	.012	.013	.013	.014	.015	.016	.017	.017	.018	8
9	.013	.014	.015	.016	.017	.018	.019	.020	.021	9
10	.015	.016	.017	.018	.019	.020	.021	.022	.023	10
11	.016	.017	.018	.019	.021	.022	.023	.024	.025	11
12	.017	.019	.020	.021	.023	.024	.025	.026	.027	12
13	.019	.020	.022	.023	.024	.026	.027	.028	.030	13
14	.020	.022	.023	.025	.026	.028	.029	.031	.032	14
15	.022	.023	.025	.027	.028	.030	.031	.033	.034	15
16	.023	.025	.027	.028	.030	.032	.033	.035	.036	16
17	.025	.027	.028	.030	.032	.034	.035	.037	.039	17
18	.026	.028	.030	.032	.034	.036	.037	.039	.042	18
19	.028	.030	.032	.034	.036	.038	.040	.042	.044	19
20	.029	.031	.033	.035	.038	.040	.042	.044	.046	20
21	.031	.033	.035	.037	.039	.042	.044	.046	.048	21
22	.032	.034	.037	.039	.041	.044	.046	.048	.050	22
23	.034	.036	.038	.041	.043	.046	.048	.050	.053	23
24	.035	.038	.040	.042	.045	.048	.050	.052	.055	24
25	.036	.039	.042	.044	.047	.049	.052	.055	.057	25
26	.038	.041	.043	.046	.049	.051	.054	.057	.060	26
27	.039	.042	.045	.048	.051	.053	.056	.059	.062	27
28	.041	.044	.047	.050	.053	.055	.058	.061	.064	28
29	.042	.045	.048	.051	.054	.057	.060	.063	.066	29

TABLE I.—*(Continued.)*

Difference of the Thermometers.	*Barometer Inches.*									Difference of the Thermometers.
	14	15	16	17	18	19	20	21	22	
	Correction to be added to the colder or subtracted from the warmer Barometer.									
30	.044	.047	.050	.053	.056	.059	.062	.066	.069	30
31	·045	.048	.052	.055	.058	.061	.065	.068	.071	31
32	.047	.050	.053	.057	.060	.063	.067	.070	.073	32
33	.048	.052	.055	.058	.062	.065	.069	.072	.076	33
34	.050	.053	.057	.060	.064	.067	.071	.074	.078	34
35	.051	.055	.058	.062	.066	.069	.073	.077	.080	35
36	.052	056	.060	.064	.068	.071	.075	.079	.083	36
37	.054	.058	.062	.065	.069	.073	.077	.081	.085	37
38	.055	.059	.063	.067	.071	.075	.079	.083	.087	38
39	.057	.061	.065	.069	.073	.077	.081	.085	.089	39
40	.058	.062	.067	.071	.075	.079	.083	.087	.091	40
41	.060	.064	.068	.073	.077	.081	.085	.090	.094	41
42	.061	.066	.070	.074	.079	.083	.087	.092	.097	42
43	.063	.067	.072	.076	.081	.085	.090	.094	.099	43
44	.064	.069	.073	.078	.083	.087	.092	.096	.101	44
45	.066	.070	.075	.080	.084	.089	.094	.098	.103	45
46	.067	.072	.077	.081	.086	.091	.096	.101	.105	46
47	.069	.074	.078	.083	.088	.093	.098	.103	.108	47
48	.070	.075	.080	.085	.090	.095	.100	.105	.110	48
49	.071	.077	.082	.087	.092	.097	.102	.107	.112	49
50	.073	.078	.083	.089	.094	.099	.104	.109	.115	50
51	.074	.080	.085	.090	.096	.101	.106	.112	.117	51
52	.076	.081	.087	.092	.098	.103	.108	.114	.119	52
53	.077	.083	.088	.094	.099	.105	.110	.116	.121	53
54	.079	.084	.090	.096	.101	.107	.112	.118	.124	54
55	.080	.086	.092	.097	.103	.109	.115	.120	.126	55
56	.082	.087	.093	.099	.105	.111	.117	.122	.128	56
57	.083	.089	.095	.101	.107	.113	.119	.125	.131	57
58	.085	.091	.097	.103	.109	.115	.121	.127	.133	58
59	.086	.092	.098	.104	.111	.117	.123	.129	.135	59

TABLE I.—*(Continued.)*

Difference of the Thermometers.	*Barometer Inches.*									Difference of the Thermometers.
	23	24	25	26	27	28	29	30	31	
	Correction to be added to the colder or subtracted from the warmer Barometer.									
0	.000	.000	.000	.000	.000	.000	.000	.000	.000	0
1	.002	.003	.003	.003	.003	.003	.003	.003	.003	1
2	.005	.005	.005	.005	.006	.006	.006	.006	.006	2
3	.007	.008	.008	.008	.008	.009	.009	.009	.010	3
4	.010	.010	.010	.011	.011	.012	.012	.013	.013	4
5	.012	.013	.013	.014	.014	.015	.015	.016	.016	5
6	.014	.015	.016	.016	.017	.018	.018	.019	.019	6
7	.017	.018	.018	.019	.020	.020	.021	.022	.023	7
8	.019	.020	.021	.022	.022	.023	.024	.025	.026	8
9	.022	.023	.023	.024	.025	.026	.027	.028	.029	9
10	.024	.025	.026	.027	.028	.029	.030	.031	.032	10
11	.026	.028	.029	.030	.031	.032	.033	.034	.036	11
12	.029	.030	.031	.032	.034	.035	.036	.038	.039	12
13	.031	.033	.034	.035	.036	.038	.039	.041	.042	13
14	.034	.035	.036	.038	.039	.041	.042	.044	.045	14
15	.036	.038	.039	.041	.042	.044	.045	.047	.048	15
16	.038	.040	.042	.043	.045	.047	.048	.050	.052	16
17	.041	.043	.044	.046	.048	.050	.051	.053	.055	17
18	.043	.045	.047	.049	.051	.053	.054	.056	.058	18
19	.046	.048	.049	.051	.053	.055	.057	.059	.061	19
20	.048	.050	.052	.054	.056	.058	.060	.063	.065	20
21	.050	.053	.055	.057	.059	.061	.063	.066	.068	21
22	.053	.055	.057	.060	.062	.064	.066	.069	.071	22
23	.055	.058	.060	.062	.065	.067	.069	.072	.074	23
24	.058	.060	.062	.065	.067	.070	.073	.075	.077	24
25	.060	.063	.065	.068	.070	.073	.076	.078	.081	25
26	.062	.065	.068	.070	.073	.076	.079	.081	.084	26
27	.065	.068	.070	.073	.076	.079	.082	.084	.087	27
28	.067	.070	.073	.076	.079	.082	.085	.088	.090	28
29	.070	.073	.075	.079	.081	.085	.088	.091	.094	29

TABLE I.—*(Continued.)*

Difference of the Thermometers.	*Barometer Inches.*									Difference of the Thermometers.
	23	24	25	26	27	28	29	30	31	
	Correction to be added to the colder or subtracted from the warmer Barometer.									
30	.072	.075	.078	.081	.084	.088	.091	.094	.097	30
31	.074	.078	.081	.084	.087	.090	.094	.097	.100	31
32	.077	.080	.083	.087	.090	.093	.097	.100	.103	32
33	.079	.083	.086	.089	.093	.096	.100	.103	.106	33
34	.081	.085	.088	.092	.096	099	.103	.106	.110	34
35	.084	.088	.091	.095	.098	.102	.106	.109	.113	35
36	.086	.090	.094	.097	.101	.105	.109	.113	.116	36
37	.089	.093	.096	.100	.104	.108	.112	.116	.119	37
38	.091	.095	.099	.103	.107	111	.115	.119	.123	38
39	.093	.098	.101	.106	.110	.114	.118	.122	.126	39
40	.096	.100	.104	.108	.112	.117	121	.125	.129	40
41	.098	.103	.107	.111	.I15	.120	124	.128	.132	41
42	.101	.105	.109	.114	.118	.123	.127	.131	.136	42
43	.103	.108	.112	.116	.121	.125	.130	.134	.139	43
44	.105	.110	.114	.119	.124	.128	.133	.138	.142	44
45	.108	.113	.117	.122	.126	.131	.136	.141	.145	45
46	.110	.115	.120	.125	.129	.134	.139	.144	.148	46
47	.113	.118	.122	.127	.132	.137	.142	.147	.152	47
48	.115	.120	.125	.130	.135	.140	.145	.150	.155	48
49	.117	.123	.127	.133	.138	.143	.148	.153	.158	49
50	.120	.125	.130	.135	.141	.146	.151	.156	.161	50
51	.122	.128	.133	.138	.143	.149	.154	.159	.165	51
52	.125	.130	.135	.141	.146	.152	.157	.163	.168	52
53	.127	.133	.138	.144	.149	.155	.160	.166	.171	53
54	.129	.135	.140	.146	.152	.158	.163	.169	.174	54
55	.132	.138	.143	.149	.155	.160	.166	.172	.177	55
56	.134	.140	.146	.152	.157	.163	.169	.175	.181	56
57	.137	.143	.148	.154	.160	.166	.172	.178	.184	57
58	.139	.145	.151	.157	.163	.169	.175	.181	.187	58
59	.141	.148	.153	.160	.166	.172	.178	.184	.190	59

TABLE II.—*Factor of the Barometers.*

Barometer fourteen Inches.				Barometer fifteen Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
14.00	330.99	14.50	315.75	15.00	301.03	15.50	286.79
.01	.68	.51	.45	.01	300.74	.51	.51
.02	.37	.52	.15	.02	.45	.52	.23
.03	.06	.53	314.85	.03	.16	.53	285.95
.04	329.75	.54	.56	.04	299.87	.54	.67
.05	.44	.55	.26	.05	.58	.55	.39
.06	.13	.56	313.96	.06	.29	.56	.11
.07	328.83	.57	.66	.07	.01	.57	284.83
.08	.52	.58	.36	.08	298.72	.58	.55
.09	.21	.59	.06	.09	.43	.59	.27
14.10	327.90	14.60	312.77	15.10	298.14	15.60	284.00
.11	.59	.61	.47	.11	297.86	.61	283.72
.12	.29	.62	.17	.12	.57	.62	.44
.13	326.98	.63	311.88	.13	.28	.63	.16
.14	.67	.64	.58	.14	296.99	.64	282.88
.15	.36	.65	.28	.15	.71	.65	.61
.16	.06	.66	310.99	.16	.42	.66	.33
.17	325.75	.67	.69	.17	.13	.67	.05
.18	.44	.68	.39	.18	295.85	.68	281.77
.19	.14	.69	.10	.19	.56	.69	.50
14.20	324.83	14.70	309.80	15.20	295.28	15.70	281.22
.21	.53	.71	.51	.21	294.99	.71	280.94
.22	.22	.72	.21	.22	.71	.72	.67
.23	323.92	.73	308.92	.23	.42	.73	.39
.24	.61	.74	.62	.24	.13	.74	.12
.25	.31	.75	.33	.25	293.85	.75	279.84
.26	.00	.76	.03	.26	.57	.76	.56
.27	322.70	.77	307.74	.27	.28	.77	.29
.28	.39	.78	.45	.28	.00	.78	.01
.29	.09	.79	.15	.29	292.71	.79	278.74

TABLE II.—*(Continued.)*

Barometer fourteen Inches.				Barometer fifteen Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
14.30	321.78	14.80	306.86	15.30	292.43	15.80	278.46
.31	.48	.81	.56	.31	.14	.81	.19
.32	.18	.82	.27	.32	291.86	.82	277.91
.33	320.87	.83	305.98	.33	.58	.83	.64
.34	.57	.84	.69	.34	.29	.84	.36
.35	.27	.85	.39	.35	.01	.85	.09
.36	319.97	.86	.10	.36	290.73	.86	276.82
.37	.66	.87	304.81	.37	.45	.87	.54
.38	.36	.88	.52	.38	.16	.88	.27
.39	.06	.89	.23	.39	289.88	.89	.00
14.40	318.76	14.90	303.93	15.40	289.60	15.90	275.72
.41	.46	.91	.64	.41	.32	.91	.45
.42	.15	.92	.35	.42	.04	.92	.18
.43	317.85	.93	.06	.43	288.75	.93	274.90
.44	.55	.94	302.77	.44	.47	.94	.63
.45	.25	.95	.48	.45	.19	.95	.36
.46	316.95	.96	.19	.46	287.91	.96	.09
.47	.65	.97	301.90	.47	.63	.97	273.82
.48	.35	.98	.61	.48	.35	.98	.54
.49	.05	.99	.32	.49	.07	.99	.27

Proportional parts for thousandths of inches.

Inches.		.001	.002	.003	.004	.005	.006	.007	.008	.009
Diff,	.31	.03	.06	.09	.12	.16	.19	.22	.25	.28
„	.30	.03	.06	.09	.12	.15	.18	.21	.24	.27
„	.29	.03	.06	.09	.12	.15	.17	.20	.23	.26
„	.28	.03	.06	.08	.11	.14	.17	.20	.22	.25
„	.27	.03	.05	.08	.11	.14	.16	.19	.22	.24

TABLE II.—*(Continued.)*

Barometer Sixteen Inches.				Barometer Seventeen Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
16.00	273.00	16.50	259.64	17.00	246.67	17.50	234.08
.01	272.73	.51	.37	.01	.42	.51	233.83
.02	.46	.52	.11	.02	.16	.52	.59
.03	.19	.53	258.85	.03	245.91	.53	.34
.04	271.92	.54	.58	.04	.65	.54	.09
.05	.64	.55	.32	.05	.40	.55	232.84
.06	.37	.56	.06	.06	.14	.56	.60
.07	.10	.57	257.80	.07	244.89	.57	.35
.08	270.83	.58	.54	.08	.63	.58	.10
.09	.56	.59	.27	.09	.38	.59	231.85
16.10	270.29	16.60	257.01	17.10	244.12	17.60	231.61
.11	.02	.61	256.75	.11	243.87	.61	.36
.12	269.75	.62	.49	.12	.62	.62	.11
.13	.49	.63	.23	.13	.36	.63	230.87
.14	.22	.64	255.97	.14	.11	.64	.62
.15	268.95	.65	.71	.15	242.86	.65	.38
.16	.68	.66	.44	.16	.60	.66	.13
.17	.41	.67	.18	.17	.35	.67	229.88
.18	.14	.68	254.92	.18	.10	.68	.64
.19	267.87	.69	.66	.19	241.84	.69	.39
16.20	267.60	16.70	254.40	17.20	241.59	17.70	229.15
.21	.34	.71	.14	.21	.34	.71	228.90
.22	.07	.72	253.88	.22	.09	.72	.66
.23	266.80	.73	.62	.23	240.83	.73	.41
.24	.53	.74	.36	.24	.58	.74	.17
.25	.27	.75	.11	.25	.33	.75	227.92
.26	.00	.76	252.85	.26	.08	.76	.68
.27	265.73	.77	.59	.27	239.83	.77	.43
.28	.47	.78	.33	.28	.58	.78	.19
.29	.20	.79	.07	.29	.32	.79	226.94

TABLE II.—*(Continued.)*

Barometer Sixteen Inches.				Barometer Seventeen Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
16.30	264.93	16.80	251.81	17.30	239.07	17.80	226.70
.31	.67	.81	.55	.31	238.82	.81	.46
.32	.40	.82	.29	.32	.57	.82	.21
.33	.13	.83	.04	.33	.32	.83	225.97
.34	263.87	.84	250.78	.34	.07	.84	.73
.35	.60	.85	.52	.35	237.82	.85	.48
.36	.34	.86	.26	.36	.57	.86	.24
.37	.07	.87	.00	.37	.32	.87	.00
.38	262.81	.88	249.75	.38	.07	.88	224.75
.39	.54	.89	.49	.39	236.82	.89	.51
16.40	262.28	16.90	249.23	17.40	236.57	17.90	224.27
.41	.01	.91	248.98	.41	.32	.91	.02
.42	261.75	.92	.72	.42	.07	.92	223.78
.43	.48	.93	.46	.43	235.82	.93	.54
.44	.22	.94	.21	.44	.57	.94	.30
.45	260.95	.95	247.95	.45	.32	.95	.06
.46	.69	.96	.69	.46	.08	.96	222.81
.47	.43	.97	.44	.47	234.83	.97	.57
.48	.16	.98	.18	.48	.58	.98	.33
.49	259.90	.99	246.93	.49	.32	.99	.09

Proportional parts for thousandths of inches.

Inches.	.001	.002	.003	004.	.005	.006	.007	.008	.009
Diff. .28	.03	.06	.08	.11	.14	.17	.20	.22	.25
,, .27	.03	.05	.08	.11	.14	.16	.19	.22	.24
,, .26	.03	.05	.08	.10	.13	.16	.18	.21	.23
,, .25	.03	.05	.08	.10	.13	.15	.18	.20	.23
,, .24	.03	.05	.07	.10	.12	.14	.17	.19	.22

TABLE II.—*(Continued.)*

Barometer Eighteen Inches.				Barometer Nineteen Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
18.00	221.85	18.30	214.67	19.00	198.37	19.30	191.56
.01	.61	.31	.43	.01	.14	.31	.34
.02	.37	.32	.19	.02	197.91	.32	.11
.03	.12	.33	213.96	.03	.68	.33	190.89
.04	220.88	.34	.72	.04	.45	.34	.66
.05	.64	.35	.48	.05	.22	.35	.44
.06	.40	.36	.25	.06	.00	.36	.21
.07	.16	.37	.01	.07	196.77	.37	189.99
.08	219.92	.38	212.77	.08	.54	.38	.77
.09	.68	.39	.54	.09	.31	.39	.54
18.10	219.44	18.40	212.30	19.10	196.09	19.40	189.32
.11	.20	.41	.07	.11	195.86	.41	.09
.12	218.96	.42	211.83	.12	.63	.42	188.87
.13	.72	.43	.59	.13	.40	.43	.65
.14	.48	.44	.36	.14	.18	.44	.42
.15	.24	.45	.12	.15	194.95	.45	.20
.16	.00	.46	210.89	.16	.72	.46	187.98
.17	217.77	.47	.65	.17	.50	.47	.75
.18	.53	.48	.42	.18	.27	.48	.53
.19	.29	.49	.18	.19	.04	.49	.31
18.20	217.05	18.50	209.95	19.20	193.82	19.50	187.09
.21	216.81	.51	.71	.21	.59	.51	186.86
.22	.57	.52	.48	.22	.37	.52	.64
.23	.33	.53	.24	.23	.14	.53	.42
.24	.10	.54	.01	.24	192.91	.54	.20
.25	215.86	.55	208.78	.25	.69	.55	185.97
.26	.62	.56	.54	.26	.46	.56	.75
.27	.38	.57	.31	.27	.24	.57	.53
.28	.14	.58	.07	.28	.01	.58	.31
.29	214.91	.59	207.84	.29	191.79	.59	.09

TABLE II.—*(Continued.)*

Barometer Eighteen Inches.				Barometer Nineteen Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
18.60	207.61	18.80	202.96	19.60	184.86	19.80	180.46
.61	.37	.81	.73	.61	.64	.81	.24
.62	.14	.82	.50	.62	.42	.82	.02
.63	206.91	.83	.27	.63	.20	.83	179.80
.64	.67	.84	.04	.64	183.98	.84	.58
.65	.44	.85	201.81	.65	.76	.85	.36
.66	.21	.86	.58	.66	.54	.86	.14
.67	205.98	.87	.35	.67	.32	.87	178.92
.68	.74	.88	.12	.68	.09	.88	.70
.69	.51	.89	200.89	.69	182.87	.89	.49
18.70	205.28	18.90	200.66	19.70	182.65	19.90	178.27
.71	.05	.91	.43	.71	.43	.91	.05
.72	204.81	.92	.20	.72	.21	.92	177.83
.73	.58	.03	199.97	.73	181.99	.93	.61
.74	.35	.94	.74	.74	.77	.94	.39
.75	.12	.95	.51	.75	.55	.95	.18
.76	203.89	.96	.28	.76	.33	.96	176.96
.77	.66	.97	.05	.77	.11	.97	.74
.78	.42	.98	198.82	.78	180.89	.98	.52
.79	.19	.99	.59	.79	.67	.99	.31

Proportional parts for thousandths of inches.

Inches.	.001	.002	.003	.004	.005	.006	.007	.008	.009
Diff. 25.	.03	.05	.08	.10	.13	.15	.18	.20	.23
" 24.	.03	.05	.07	.10	.12	.14	.17	.19	.22
" 23.	.02	.05	.07	.09	.12	.14	.16	.18	.21
" 22.	.02	.04	.07	.09	.11	.13	.15	.18	.20
" 21.	.02	.04	.06	.08	.11	.13	.15	.17	.19

TABLE II.—*(Continued.)*

Barometer Twenty Inches.				Barometer Twenty-one Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
20.00	176.09	20.30	169.62	21.00	154.90	21.30	148.74
.01	175.87	.31	.41	.01	.69	.31	.54
.02	.66	.32	.20	.02	.49	.32	.33
.03	.44	.33	168.98	.03	.28	.33	.13
.04	.22	.34	.77	.04	.07	.34	147.93
.05	.01	.35	.56	.05	153.87	.35	.73
.06	174.79	.36	.34	.06	.66	.36	.62
.07	.57	.37	.13	.07	.46	.37	.32
.08	.36	.38	167.92	.08	.25	.38	.11
.09	.14	.39	.70	.09	.04	.39	146.91
20.10	173.92	20.40	167.49	21.10	152.84	21.40	146.71
.11	.71	.41	.28	.11	.63	.41	.50
.12	.49	.42	.06	.12	.43	.42	.30
.13	.28	.43	166.85	.13	.22	.43	.10
.14	.06	.44	.64	.14	.01	.44	145.90
.15	172.84	.45	.43	.15	151.81	.45	.69
.16	.63	.46	.21	.16	.60	.46	.49
.17	.41	.47	.00	.17	.40	.47	.29
.18	.20	.48	165.79	.18	.19	.48	.09
.19	171.98	.49	.68	.19	150.99	.49	144.88
20.20	171.77	20.50	165.37	21.20	150.78	21.50	144.68
.21	.55	.51	.15	.21	.58	.51	.48
.22	.34	.52	164.94	.22	.37	.52	.28
.23	.12	.53	.73	.23	.17	.53	.08
.24	170.91	.54	.52	.24	149.97	.54	143.87
.25	.69	.55	.31	.25	.76	.55	.67
.26	.48	.56	.10	.26	.56	.56	.47
.27	.27	.57	163.89	.27	.35	.57	.27
.28	.05	.58	.67	.28	.15	.58	.07
.29	169.84	.59	.46	.29	148.94	.59	142.87

TABLE II.—*(Continued.)*

Barometer Twenty Inches.				Barometer Twenty-one Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
20.60	163.25	20.80	159.06	21.60	142.67	21.80	138.66
.61	.04	.81	158.85	.61	.47	.81	.46
.62	162.83	.82	.64	.62	.26	.82	.27
.63	.62	.83	.43	.63	.06	.83	.07
.64	.41	.84	.22	.64	141.86	.84	137.87
.65	.20	.85	.01	.65	.66	.85	.67
.66	161.99	.86	157.81	.66	.46	.86	.47
.67	.73	.87	.60	.67	.26	.87	.27
.68	.57	.88	.39	.68	.06	.88	.07
.69	.36	.89	.18	.69	140.86	.89	136.87
20.70	161.15	20.90	156.97	21.70	140.66	21.90	136.68
.71	160.94	.91	.77	.71	.46	.91	.48
.72	.73	.92	.56	.72	.26	.92	.28
.73	.52	.93	.35	.73	.06	.93	.08
.74	.31	.94	.14	.74	139.86	.94	135.88
.75	.10	.95	155.94	.75	.66	.95	.69
.76	159.89	.96	.73	.76	.46	.96	.49
.77	.68	.97	.52	.77	.26	.97	.29
.78	.47	.98	.31	.78	.06	.98	.09
.79	.27	.99	.11	.79	138.86	.99	134.89

Proportional parts for thousandths of inches.

Inches.	.001	.002	.003	.004	.005	.006	.007	.008	.009
Diff. .22	.02	.04	.07	.09	.11	.13	.15	.18	.20
„ .21	.02	.04	.06	.08	.11	.13	.15	.17	.19
„ .20	.02	.04	.06	.08	.10	.12	.14	.16	.18
„ .19	.02	.04	.06	.08	.10	.11	.13	.15	.17

TABLE II.—*(Continued.)*

Barometer Twenty-two Inches.				Barometer Twenty-three Inches.			
Inches.	Factor.	Inches	Factor.	Inches.	Factor.	Inches.	Factor.
22.00	134.70	22.30	128.82	23.00	115.39	23.30	109.76
.01	.50	.31	.62	.01	.20	.31	.58
.02	.30	.32	.43	.02	.01	.32	.39
.03	.11	.33	.23	.03	114.83	.33	.21
.04	133.91	.34	.04	.04	.64	.34	.02
.05	.71	.35	127 84	.05	.45	.35	108.83
.06	.51	.36	.65	.06	.26	.36	.65
.07	.32	.37	.45	.07	.07	.37	.46
.08	.12	.38	.26	.08	113.88	.38	.28
.09	132.92	.39	.07	.09	.70	.39	.09
22.10	132.73	22.40	126.87	23.10	113.51	23.40	107.90
.11	.53	.41	.68	.11	.32	.41	.72
.12	.33	.42	.48	.12	.13	.42	.53
.13	.14	.43	.29	.13	112.94	.43	.35
.14	131.94	.44	.10	.14	.76	.44	.16
.15	.75	.45	125.90	.15	.57	.45	106.98
.16	.55	.46	.71	.16	.38	.46	.79
.17	.35	.47	.52	.17	.19	.47	.61
.18	.16	.48	.32	.18	.01	.48	.42
.19	130.96	.49	.13	.19	111.82	.49	.24
22.20	130.77	22.50	124.94	23.20	111.63	23.50	106.05
.21	.57	.51	.74	.21	.44	.51	105.87
.22	.38	.52	.55	.22	.26	.52	.68
.23	.18	.53	.36	.23	.07	.53	.50
.24	129.99	.54	.17	.24	110.88	.54	.31
.25	.79	.55	123.97	.25	.70	.55	.13
.26	.59	.56	.78	.26	.51	.56	104.94
.27	.40	.57	.59	.27	.32	.57	.76
.28	.20	.58	.40	.28	.14	.58	.58
.29	.01	.59	.20	.29	109.95	.59	.39

TABLE II.—*(Continued.)*

Barometer Twenty-two Inches.				Barometer Twenty-three Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
22.60	123.01	22.80	119.19	23.60	104.21	23.80	100.54
.61	122.82	.81	118.99	.61	.02	.81	.36
.62	.63	.82	.80	.62	103.84	.82	.18
.63	.44	.83	.61	.63	.66	.83	.00
.64	.24	.84	.42	.64	.47	.84	99.81
.65	.05	.85	.23	.65	.29	.85	.63
.66	121.86	.86	.04	.66	.11	.86	.45
.67	.67	.87	117.85	.67	102.92	.87	.27
.68	.48	.88	.66	.68	.74	.88	.09
.69	.29	.89	.47	.69	.55	.89	98.90
22.70	121.09	22.90	117.28	23.70	102.37	23.90	98.72
.71	120.90	.91	.09	.71	.19	.91	.54
.72	.71	.92	116.91	.72	.01	.92	.36
.73	.52	.93	.72	.73	101.82	.93	.18
.74	.33	.94	.53	.74	.63	.94	.00
.75	.14	.95	.34	.75	.44	.95	97.81
.76	119.95	.96	.15	.76	.26	.96	.63
.77	.76	.97	115.96	.77	.07	.97	.45
.78	.57	.98	.77	.78	100.99	.98	.27
.79	.38	.99	.58	.79	.71	.99	.09

Proportional parts for thousandths of inches.

Inches.		.001	.002	.003	.004	.005	.006	.007	.008	.009
Diff.	.20	.02	.04	.06	.08	.10	.12	.14	.16	.18
,,	.19	.02	.04	.06	.08	.10	.11	.13	.15	.17
,,	.18	.02	.04	.05	.07	.09	.11	.13	.14	.16

TABLE II.—*(Continued.)*

Barometer Twenty-four Inches.				Barometer Twenty-five Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
24.00	96.91	24.30	91.51	25.00	79.18	25.30	74.00
.01	.73	.31	.33	.01	.01	.31	73.83
.02	.55	.32	.16	.02	78.83	.32	.66
.03	.37	.33	90.98	.03	.66	.33	.48
.04	.19	.34	.80	.04	.49	.34	.31
.05	.00	.35	.62	.05	.31	.35	.14
.06	95.82	.36	.44	.06	.14	.36	72.97
.07	.64	.37	.26	.07	77.97	.37	.80
.08	.46	.38	.09	.08	.79	.38	.63
.09	.28	.39	89.91	.09	.62	.39	.46
24.10	95.10	24.40	89.73	25.10	77.45	25.40	72.29
.11	94.92	.41	.55	.11	.27	.41	.12
.12	.74	.42	.37	.12	.10	.42	71.94
.13	.56	.43	.20	.13	76.93	.43	.77
.14	.38	.44	.02	.14	.75	.44	.60
.15	.20	.45	88.84	.15	.58	.45	.43
.16	.02	.46	.66	.16	.41	.46	.26
.17	93.84	.47	.49	.17	.24	.47	.09
.18	.66	.48	.31	.18	.06	.48	70.92
.19	.48	.49	.13	.19	75.89	.49	.75
24.20	93.30	24.50	87.95	25.20	75.72	25.50	70.58
.21	.13	.51	.78	.21	.55	.51	.41
.22	92.95	.52	.60	.22	.37	.52	.24
.23	.77	.53	.42	.23	.20	.53	.07
.24	.59	.54	.25	.24	.03	.54	69.90
.25	.41	.55	.07	.25	74.86	.55	.73
.26	.23	.56	86.89	.26	.69	.56	.56
.27	.05	.57	.71	.27	.51	.57	.39
.28	91.87	.58	.54	.28	.34	.58	.22
.29	.69	.59	.36	.29	.17	.59	.05

TABLE II.—*(Continued.)*

Barometer Twenty-four Inches.				Barometer Twenty-five Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
24.60	86.18	24.80	82.67	25.60	68.88	25.80	65.50
.61	.01	.81	.49	.61	.71	.81	.33
.62	85.83	.82	.32	.62	.54	.82	.16
.63	.66	.83	.14	.63	.37	.83	.00
.64	.48	.84	81.97	.64	.20	.84	64.83
.65	.30	.85	.79	.65	.03	.85	.66
.66	.13	.86	.62	.66	67.86	.86	.49
.67	84.95	.87	.44	.67	.69	.87	.32
.68	.77	.88	.27	.68	.52	.88	.16
.69	.60	.89	.10	.69	.36	.89	63.99
24.70	84.42	24.90	80.92	25.70	67.19	25.90	63.82
.71	.25	.91	.75	.71	.02	.91	.65
.72	.07	.92	.57	.72	66.85	.92	.48
.73	83.90	.93	.40	.73	.68	.93	.32
.74	.72	.94	.22	.74	.51	.94	.15
.75	.54	.95	.05	.75	.34	.95	62.98
.76	.37	.96	79.88	.76	.17	.96	.82
.77	.19	.97	.70	.77	.01	.97	.65
.78	.02	.98	.53	.78	65.84	.98	.48
.79	82.84	.99	.35	.79	.67	.99	.31

Proportional parts for thousandths of inches.

Inches.	.001	.002	.003	.004	.005	.006	.007	.008	.009
Diff	.19	.02	.04	.06	.08	.10	.11	.13	.15	.17
,,	.18	.02	.04	.05	.07	.09	.11	.13	.14	.16
,,	.17	.02	.03	.05	.07	.09	.10	.12	.14	.15
,,	.16	.02	.03	.05	.06	.08	.10	.11	.13	.14

TABLE II.—*(Continued.)*

Barometer Twenty-six Inches.				Barometer Twenty-seven Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
26.00	62.15	26.30	57.16	27.00	45.76	27.30	40.96
.01	61.98	.31	.00	.01	.60	.31	.80
.02	.81	.32	56.83	.02	.43	.32	.64
.03	.65	.33	.67	.03	.27	.33	.48
.04	.48	.34	.50	.04	.11	.34	.32
.05	.31	.35	.34	.05	44.95	.35	.16
.06	.15	.36	.17	.06	.79	.36	.00
.07	60.98	.37	.01	.07	.63	.37	39.85
.08	.81	.38	55.85	.08	.47	.38	.59
.09	.65	.39	.68	.09	.31	.39	.53
26.10	60.48	26.40	55.52	27.10	44.15	27.40	39.37
.11	.31	.41	.35	.11	43.99	.41	.21
.12	.15	.42	.19	.12	.83	.42	.05
.13	59.98	.43	.02	.13	.67	.43	38.89
.14	.81	.44	54.86	.14	.51	.44	.74
.15	.65	.45	.69	.15	.35	.45	.58
.16	.48	.46	.53	.16	.19	.46	.42
.17	.32	.47	.37	.17	.03	.47	.26
.18	.15	.48	.20	.18	42.87	.48	.10
.19	58.98	.49	.04	.19	.71	.49	37.95
26.20	58.82	26.50	53.87	27.20	42.55	27.50	37.79
.21	.65	.51	.71	.21	.39	.51	.63
.22	.49	.52	.55	.22	.23	.52	.47
.23	.32	.53	.38	.23	.07	.53	.31
.24	.16	.54	.22	.24	41.91	.54	.16
.25	57.99	.55	.06	.25	.75	.55	.00
.26	.83	.56	52.89	.26	.59	.56	36.84
.27	.66	.57	.73	.27	.43	.57	.68
.28	.49	.58	.66	.28	.28	.58	.63
.29	.33	.59	.40	.29	.12	.59	.37

TABLE II.—*(Continued.)*

Barometer Twenty-six Inches.				Barometer Twenty-seven Inches.			
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
26.60	52.24	26.80	48.99	27.60	36.21	27.80	33.08
.61	.08	.81	.82	.61	.05	.81	32.92
.62	51.91	.82	.66	.62	35.90	.82	.76
.63	.75	.83	.50	.63	.74	.83	.61
.64	.59	.84	.34	.64	.58	.84	.45
.65	.42	.85	.18	.65	.42	.85	.29
.66	.26	.86	.01	.66	.27	.86	.14
.67	.10	.87	47.85	.67	.11	.87	31.98
.68	50.93	.88	.69	.68	34.95	.88	.83
.69	.77	.89	.53	.69	.80	.89	.67
26.70	50.61	26.90	47.37	27.70	34.64	27.90	31.52
.71	.45	.91	.21	.71	.48	.91	.36
.72	.28	.92	.04	.72	.33	.92	.20
.73	.12	.93	46.88	.73	.17	.93	.05
.74	49.96	.94	.72	.74	.01	.94	30.89
.75	.80	.95	.56	.75	33.86	.95	.74
.76	.63	.96	.40	.76	.70	.96	.58
.77	.47	.97	.24	.77	.54	.97	.43
.78	.31	.98	.08	.78	.39	.98	.27
.79	.15	.99	45.92	.79	.23	.99	.12

Proportional parts for thousandths of Inches.

Inches.		.001	.002	.003	.004	.005	.006	.007	.008	.009
Diff.	.17	.02	.03	.05	.07	.09	.10	.12	.14	.15
,,	.16	.02	.03	.05	.06	.08	.10	.11	.13	.14
,,	.15	.01	.03	.04	.06	.08	.09	.11	.12	.14

TABLE II.—*Factor of the Barometers.*

Barometer Twenty-eight Inches.				Barometer Twenty-nine Inches.				Barometer Thirty Inches.	
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
28.00	29.96	28.30	25.33	29.00	14.72	29.30	10.25	30.00	0.00
.01	.81	.31	.18	.01	.57	.31	.10	.01	.14
.02	.65	.32	.03	.02	.42	.32	9.96	.02	.29
.03	.50	.33	24.87	.03	.27	.33	.81	.03	.44
.04	.34	.34	.72	.04	.12	.34	.66	.04	.58
.05	.19	.35	.57	.05	13.97	.35	.51	.05	.72
.06	.03	.36	.41	.06	.82	.36	.36	.06	.87
.07	28.88	.37	.26	.07	.67	.37	.22	.07	1.01
.08	.72	.38	.11	.08	.53	.38	.07	.08	.16
.09	.57	.39	23.95	.09	.38	.39	8.92	.09	.30
28.10	28.41	28.40	23.80	29.10	13.23	29.40	8.77	30.10	1.45
.11	.26	.41	.65	.11	.08	.41	.62	.11	.59
.12	.10	.42	.50	.12	12.93	.42	.48	.12	.74
.13	27.95	.43	.34	.13	.78	.43	.33	.13	.88
.14	.80	.44	.19	.14	.63	.44	.18	.14	2.02
.15	.64	.45	.04	.15	.48	.45	.03	.15	.17
.16	.49	.46	22.89	.16	.33	.46	7.89	.16	.31
.17	.33	.47	.73	.17	.18	.47	.74	.17	.46
.18	.18	.48	.58	.18	.03	.48	.59	.18	.60
.19	.02	.49	.43	.19	11.89	.49	.45	.19	.74
28.20	26.87	28.50	22.28	29.20	11.74	29.50	7.30	30.20	2.89
.21	.72	.51	.12	.21	.59	.51	.15	.21	3.03
.22	.56	.52	21.97	.22	.44	.52	.00	.22	.17
.23	.41	.53	.82	.23	.29	.53	6.86	.23	.32
.24	.26	.54	.67	.24	.14	.54	.71	.24	.46
.25	.10	.55	.51	.25	10.99	.55	.56	.25	.61
.26	25.95	.56	.36	.26	.85	.56	.42	.26	.75
.27	.79	.57	.21	.27	.70	.57	.27	.27	.89
.28	.64	.58	.06	.28	.55	.58	.12	.28	4.04
.29	.49	.59	20.91	.29	.40	.59	5.97	.29	.18

TABLE II.—*(Continued.)*

Barometer Twenty-eight Inches.				Barometer Twenty-nine Inches.				Barometer Thirty Inches.	
Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.	Inches.	Factor.
28.60	20.75	28.80	17.73	29.60	5.83	29.80	2.90	30.30	4.32
.61	.60	.81	.58	.61	.68	.81	.76	.31	.47
.62	.45	.82	.43	.62	.53	.82	.61	.32	.61
.63	.30	.83	.28	.63	.39	.83	.47	.33	.75
.64	.15	.84	.12	.64	.24	.84	.32	.34	.90
.65	.00	.85	16.97	.65	.10	.85	.18	.35	5.04
.66	19.84	.86	.82	.66	4.95	.86	.03	.36	.18
.67	.69	.87	.67	.67	.80	.87	1.88	.37	.32
.68	.54	.88	.52	.68	.66	.88	.74	.38	.47
.69	.39	.89	.37	.69	.51	.89	.59	.39	.61
28.70	19.24	28.90	16.22	29.70	4.36	29.90	1.45	30.40	5.75
.71	.09	.91	.07	.71	.22	.91	.30	.41	.90
.72	18.94	.92	15.92	.72	.07	.92	.16	.42	6.04
.73	.78	.93	.77	.73	3.93	.93	.01	.43	.18
.74	.63	.94	.62	.74	.78	.94	0.87	.44	.32
.75	.48	.95	.47	.75	.63	.95	.72	.45	.47
.76	.33	.96	.32	.76	.49	.96	.58	.46	.61
.77	.18	.97	.17	.77	.34	.97	.43	.47	.75
.78	.03	.98	.02	.78	.20	.98	.29	.48	.89
.79	17.88	.99	14.87	.79	.05	.99	.14	.49	7.04

Proportional parts for thousandths of inches.

Inches.		.001	.002	.003	.004	.005	.006	.007	.008	.009
Diff.	.16	.02	.03	.05	.06	.08	.10	.11	.13	.14
,,	.15	.02	.03	.05	.06	.08	.09	.11	.12	.14
,,	.14	.01	.03	.04	.06	.07	.08	.10	.11	.13

TABLE III.—*Factors for the sum of the detached Thermometers.*

Sum.	Factor.
40	58.74
50	59.41
60	60.08
70	60.75
80	61.42
90	62.09
100	62.76
110	63.43
120	64.10
130	64.77
140	65.44
150	66.11
160	66.78
170	67.45
180	68.12
190	68.79
200	69.46

Difference for single Degrees.

1	0.07
2	0.13
3	0.20
4	0.27
5	0.34
6	0.40
7	0.47
8	0.54
9	0.60

TABLE IV.—*Correction for Latitude.*

Altitude in Feet.	Latitude.						
	0	10	20	25	30	35	40
	Correction in feet additive.						
1000	3	3	2	2	1	1	0
2000	5	5	4	3	3	2	1
3000	8	8	6	5	4	3	1
4000	11	10	8	7	5	4	2
5000	13	13	10	9	7	5	2
6000	16	15	12	10	8	6	3
7000	19	18	14	12	9	6	3
8000	22	20	17	14	11	7	4
9000	24	23	19	16	12	8	4
10000	27	25	21	17	13	9	5
11000	30	28	23	19	15	10	5
12000	32	30	25	21	16	11	6
13000	35	33	27	23	18	12	6
14000	38	35	29	24	19	13	7
15000	40	38	31	26	20	14	7
16000	43	41	33	28	21	15	7
17000	46	43	35	29	23	16	8
18000	49	46	37	31	24	17	8
19000	51	48	39	33	26	18	9
	Correction in feet, subtractive						
	90	80	70	65	60	55	50
	Latitude.						

On the Encrustation of Steam Boilers and Pipes in India.—By Dr. Geo. Buist, *Bombay.*

A very serious source of annoyance to the Steam Engineer in India is the extreme rapidity with which encrustations collect in the recesses of flues, and around the tubes of steam boilers. These often accumulate in parts of the boiler difficult of access, to the thickness of an inch in the course of a year—they intercept heat, diminish the generation of steam, and by permitting the temperature of the iron outside to get high, with a non-conducting substance, rapidly cause oxidation. The crust generally consists of sulphate and carbonate of lime, with a large portion of dried sea salt. The greatest inconvenience is felt with tube boilers. I have known the whole of the tubes burnt out in six months' time, and have seen them, when placed too close to each other, cemented into a solid mass, with the stony matter between. The stony matter consists of sulphate and carbonate of lime, with a very large proportion of sea salt, hardened by the great heat of the flues and tubes when the boiler is emptied too soon after the fires are drawn.

The remedies proposed for this unfortunate state of things are very numerous; none of them have, I believe, proved so successful as might have been desired. I have suggested the expediency of running off the brine leisurely, and filling up the boiler either with sea water not concentrated by boiling, or with fresh water, where this was accessible, so as by these means to get rid of the soluble part of the crust, when the earthy portion, deprived of this, would become so friable and spongy as to drop off.

Dr. Giraud has suggested hanging portions of broken crust in bags inside the boiler, in hopes of affording a nucleus of depositure preferable to that provided by the tubes or the boilers themselves.

The Engineers get quit of the crust when it is thin by running off the boilers, and allowing the encrustation to become perfectly dry. When cold, a sudden blaze of chips is lighted in the furnace, by which means the crustings inside crack and drop off. When they grow thick and troublesome, workmen are sent inside the boiler to chop them off.

A curious variety of metallic deposit sometimes occurs on the steam pipe, close to its connection with the cylinder, when the boiler is of iron, the pipe of copper or mixed metal containing copper, a specimen of this accompanies this paper.* It is about half an inch thick, and consists of alternate layers of pure copper, about forty in number, and of copper slightly oxydized. This was found in the steam pipe of the P. and O. S. N. Co.'s Steamer Pekin, which connected the fore and after boilers together: the boilers are iron, the connecting pipe copper. There is a considerable scale of rust on the plate through which the pipe passes: there are lead joints between the copper and the iron, to prevent or diminish the action of the metals on each other. The copper crust was found immediately inside the stop valves and extended about a foot into the pipe. The same action is believed to be going on in all the copper pipes, but in this case it was collected by the self-action stop valves: in the other cases the cupreous solution flowed into the boiler or cylinder, and was lost. For the specimen now sent I am indebted to Captain Gribble, and for the information regarding it to Captain Baker, of the Pekin.

It is quite clear here that a complex series of chemical processes must have been going on to produce this beautiful specimen of Electro-type copper, which was soft, and cut like black lead when first received, though it has now assumed its proper hardness. We must first have had the copper dissolved by the steam or water in the pipe, the solution collected beyond the stop valve must have been revived by galvanic action induced by the copper and iron on each other. It is probable that each layer was due to a single working of the boilers, and that the open film between was produced when the steam was down. No similar deposit has ever been met with by any of the Engineers I have seen.

* Deposited in the Museum of the Asiatic Society.—Eds.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL

FOR JUNE, 1850.

At a Meeting of the Asiatic Society of Bengal held on the 5th June, 1850,

The Hon'ble Sir J. W. COLVILE, President, in the Chair,

The proceedings of the May Meeting were read and confirmed.

Letters were read—

From G. A. Bushby, Esq. and Lieut. A. G. Austen, intimating their desire to withdraw from the Society.

From J. Thornton, Esq., Secretary to the Government of the North Western Provinces, enclosing, in original, the first 70 paragraphs of a Report on the Statistics of the Banda district, drawn up by Mr. M. P. Edgeworth, Esq. C. S. Ordered for publication in the Journal.

From Munshi Nizam-Ud-dín of Poonah, offering his services to the Society as a translator, and forwarding a copy of a Hindustáni work by him, entitled Insha-i-Hindi.

From Captain J. C. Hannyngton, submitting a set of Tables for computing heights by the Barometer.

From Rev. J. Long, soliciting copies of the Bibliotheca Indica for ten Vernacular Libraries established by the Church Missionary Society, in Calcutta, Krishnaghur and Burdwan.

Ordered that the subject be brought forward for consideration at the next meeting, and that in the meantime, Rev. Mr. Long be requested to send in an official letter regarding it.

From Captain Thuillier, offering copy of a Map of Sikkim and Eastern Nepaul, by Dr. J. D. Hooker, for publication in the Society's Journal.

Ordered that the Secretary and the Finance Committee consider and report as to the expense of publishing it in the Journal.

From W. Seton Karr, Esq., Under Secretary to the Government of Bengal, regarding an application of the Statistical Section of the Society, for permission to have access to the Index to the records of the Bengal Secretary's Office.

From the Under Secretary to the Government of Bengal,
To the Vice President and Secretary to the Asiatic Society.

Dated Fort William, the 8th May, 1850.

Sir,—I am directed by the Deputy Governor of Bengal to acknowledge the receipt of your letter, dated the 27th March last, submitting a solicitation, on the part of the Statistical Section of the Asiatic Society, for permission to have access to the records of the Bengal Secretary's Office, with a view to the publication of it's Indices.

2. His honor regrets that he is unable to comply with the above request.

I have the honor to be, Sir,
Your most Obedient Servant,
W. Seton Karr.
Under Secy. to the Govt. of Bengal.

From P. B. Reid, Esq. Secretary to the Agra Local Agency, enclosing a memorandum of five gold coins, lately dug out of a ruin in the vicinity of the Agra Fort, and enquiring whether the Society would like to purchase them.

Resolved, that the Society does not consider it desirable to purchase the coins.

From Captain H. L. Thuillier, Deputy Surveyor General, forwarding Tables of the monthly means of Maximum and Minimum Pressures from 1840 to 1849, taken from the Meteorological Register kept at the Surveyor General's Office, Calcutta.

From Mauluvi Golám Akbar, late Persian Librarian, praying for a testimonial for his past services to the Society.

Resolved, that the Secretary be desired to grant the request of the Mauluvi.

From Dr. E. Roer, Secretary to the Oriental Section, recommending on the part of the Section, the publication of a translation of the Ch'handogya Upanishad by Bábu Rájendralal Mittra.

Ordered for publication in the Bibliotheca Indica.

From the same, the subjoined letter, in reply to a reference from the Society, regarding the Section's report of the 1st. April last.

To Captain F. HAYES, *Secretary, Asiatic Society.*

SIR,—By direction of the Oriental Section, I have the honour to return, for the orders of the Council and the Society, my Report of the 1st April last on Oriental Publications, referred for the reconsideration of the Section, and to state, that the Section would recommend, that the publication of texts should proceed, and the translations follow as soon as practicable.

2. I beg to observe, that in proposing so many texts for publication it was not intended, that all of them should be printed with the exclusion of other important works, which might hereafter be proposed by other scholars, but that sufficient time should be given to obtain good MSS. to examine and to compare them. Without this we would not be able to publish editions worthy of the high standing of our Society. The necessity of an early selection will be evident from the fact, that the Library of the Asiatic Society hardly contains one MS. fit for printing, and that, had I not been assisted by MSS. procured either from public collections, or private individuals, I would not have succeeded in publishing even one of the works already printed. I may perhaps not be able to collect a third of the works proposed, and on their collection the MSS. may prove so bad as to preclude the hope of their early publication. Of the works enumerated in the list, only two are prepared for printing, viz. the Uttara Naishadha, of which I have procured a sufficient number of MSS., and the Bhásbá Parich'héda of which the translation is ready.

3. I have the honour to lay before the Society abstracts of interesting letters, received from Messrs. Lassen, Burnouf and Müeller, on our publications, and I hope, that the discussion, which at the April meeting took place on the mode of my publishing, may serve as an apology for not having omitted the flattering expressions about myself.

I have the honour to be, Sir,

Your most obedient servant,

E. ROER.

Secy. Asiatic Society, Oriental Department.

Howrah, the 1st June, 1850.

To Dr. W. B. O'Shaughnessy, *Senior Secretary of the Asiatic Society.*

Sir,—The publication of the Upanishads, which are accompanied with a commentary of S'ankara Á'chárya, being nearly completed, I have the honour, by direction of the Oriental Section, to propose, for the consideration and orders of the Council and Society, the gradual publication of the following works in the Bibliotheca Indica:

1. The Uttara Naishadha, or the second part of the Naishadha, together with the commentary of Náráyan Pandit.
2. Tha Vaishéika Sútras with the commentary of Sri Sankara.
3. The Bhásha Parich'héda with an English translation.
4. A selection from the best Dramas in Sanskrit, not yet published.
5. The Puránas.
6. The most important Astronomical works of the Hindus, and at first Varáhamíhira's Várábi Sanhitá and Pancha Siddhantas, if these works can be obtained.
7. Nala Champu.
8. Bhoja Champu.
9. Bharata Champu.
10. Rághava Pándavíya.
11. Anargha Rághava.

By the completion of the Naishadha the Society, who published the first part in 1836, would gratify the wishes of the Oriental scholars in Europe as well as in India. As Prem Chander Pandit of the Sanskrit College in Calcutta, who has written the commentary to the first part of this work, is not prepared to furnish us with a commentary to the second, the Section proposes, that the Tiká of Náráyan Pandit, one of the oldest and best commentaries, be added to the text.

The Sútras of Kanáda deserve also the early patronage of the Society, as no work of the Vaishésika school of philosophy has yet been printed.

The Society, some years ago, sanctioned the publication of the text of the Bhásha Parich'héda together with an English translation which I had prepared. This translation, as the Society will recollect, was lost by the transfer of papers from the former Secretary's office. I have since revised a rough copy, and have now the pleasure to offer it to the Society for publication, together with the preface and text, in the Bibliotheca Indica.

2. It is further proposed: 1.—That every three months copies of the Bibliotheca should be sent to those Societies and scholars to whom they were presented before. 2.—That 25 copies should be, regularly every month, transmitted to Messrs. Allen and Co., complaints having reached us, that no copies are for sale in Europe. 3.—That a certain number of copies should

be forwarded to the School-Book-Societies in Allahabad and Agra, and to booksellers in Bombay and Madras, for sale on account of the Society.

3. The Section beg to recommend the purchase of the accompanying MS., containing a Persian translation of the Upanishads, which has been offered to the Society at the price of 12 Rupees.

I have the honour to be, Sir,

Your most obedient servant,

E. Roer,

Secretary, Oriental Section, Asiatic Society.

Howrah, the 1st April, 1850.

Resolved, that the Society adopt the proposition of the Oriental Section regarding the publication of the Uttara Naishadha and Bhásha Parich'héda, and for the transmission of the copies proposed to be sent to Messrs. Allen and Co., and to the bodies and persons to whom copies of the Bibliotheca Indica have hitherto been sent, and refers it to the Oriental Section to consider and report, whether the list of bodies and persons to whom that publication is now sent, may, to any, or what extent, be usefully enlarged.

From John Barlow, Esq., Secretary to the Royal Institution of Great Britain, acknowledging receipt of No. 206 of the Journal, presented to that Institution by the Society.

From D. Edward Ruppell, Esq., Frankfort, offering a set of his Zoological works in exchange for a set of the Transactions of the Society.

Ordered that the Secretary communicate to Mr. Ruppell, that a set of the Asiatic Researches from VI. @ XX. (the first five volumes being out of print) will be forwarded to Messrs. Allen and Co. to whom he may send his works for the Society.

From George Balfour, Esq., Magistrate of Monghyr, regarding the gold coins submitted to the Society for inspection, by Mr. Cunliffe.

The coins were ordered to be returned to Mr. Balfour.

From Dr. E. Roer, Secretary, Oriental Section, recommending that an English translation of the Lalita Vistara submitted to the Section by Bábu Rajendralál Mittra, be published in the Bibliotheca Indica.

Resolved unanimously, that the recommendation of the Oriental Section be adopted.

From the same, proposing that the Rev. Principal Kay of Bishop's College, be elected a member of the Oriental Section.

On the question being put to the vote Rev. W. Kay was unanimously elected.

From Col. J. Low, Penang, announcing despatch of a collection of MSS. and Antiquities per "Erin," for the Society.

The Zoological Curator and Librarian having submitted their reports the Society adjourned.

Read and confirmed, 3rd July, 1850.

J. W. Colvile, *President.*
Fletcher Hayes, *Secretary.*

Report of Curator, Zoological Department, for June Meeting, 1850.

Sir,—I have to announce the presentations of a rare Australian Parrakeet (*Psephotus hæmatonotus*, Gould), by Capt. Lewis of the Barque 'Tenasserim,' and of the carcass of a Bara Singha doe (*Cervus Duvaucelie*, Cuv.), by Bábu Rájendra Mallika.

And I have personally the pleasure of presenting the Society with skeletons of the Peruvian Llama, Snowy Owl, Crowned Crane, and Hooper Swan. Also with a collection of some of the more shewy Brazilian *Paperes* (chiefly *Pipræ*, *Tanagræ*, and *Trochilidæ*), adding 38 species to our bird collection; and with an extensive series of land, fresh-water and marine Australian shells.

Lastly, I may mention that I have succeeded in procuring for the Museum, skeletons of both sexes of a species of Ca'ing Whale (*Globicephalus*,) in form and size resembling the European *Gl. deductor*, but wholly of a deep black colour. A shoal of these animals numbering about 20, was carried by an extraordinary high tide, into the salt-water lakes eastward of Calcutta, where several of them lived many days, floundering about in the shallow-water; and in this situation I had repeated opportunities of witnessing the expiration from the spiracle within the distance of a few feet, no jet of water of course being thrown up, but a very visible discharge of aqueous particles, as from a wet syringe, and this while the spiracle remained above water.

I have the honour to be, Sir,
Your's obediently,
E. Blyth.

Asiatic Society's Rooms, June 1st, 1850.

Library.

The following books have been added to the library since the last meeting.

Presented.

On the Vegetation of the Galapagos Archipelago as compared with that

of some other Tropical Islands and of the Continent of America. By Dr. J. D. Hooker. (Pamphlet.)—PRESENTED BY THE AUTHOR.

Journal of the Academy of Natural Sciences of Philadelphia, Vol. I. Part IV.—PRESENTED BY THE ACADEMY.

Systematisches Verzeichniss der naturhistorischen Sammlung der Gesellschaft Museum. Erste abthielung. Voegel. Bremen, 1844, 4to.—BY DR. G. HARTLAUB.

Systematischer Index zu Don Felix de Azara's Apuntamientos para la historia natural d los paxaros del Paraguay y Rio de la Plata. Von Dr. G. Hartlaub. Bremen, 1847, demi 4to.—BY THE AUTHOR.

Erstes Nachtrag zum Verzeichniss der Vogelsammlung des Museums. (Pamphlet.)—BY DR. G. HARTLAUB.

Wanderings in the Islands of Interview (Andaman) Little and Great Coco. By J. H. Quigley, Esq. Maulmain, 1850, 12mo. Pamphlet.—BY THE AUTHOR.

Fontana on Poisons, 2 vols. 8vo.—BY DR. W. B. O'SHAUGHNESSY.

Mead on Poisons, 1 vol. 8vo.—BY THE SAME.

Catalogue des Coins et Medaelles du Musee Monitaire de la Commission des Monnaire et Medailles, Paris, 1833, 8vo.—BY THE SAME.

Journal of the Agri-Horticultural Society of India, Nos. X.-XI. of Vol. II. and Part II. Vol. VI.—BY THE SAME.

Calcutta Journal of Natural History, Nos. 1, 3, (two copies) 10, 11, 12, 14, and 17.—BY THE SAME.

Griffin's Scientific Miscellany, No. VI. The Geology of the Island of Arran, from Original Survey. By A. C. Ramsey, (2 copies).—BY THE SAME.

Insha i Hindi, being a collection of some hundreds of letters and petitions, &c. with an entire translation of the Inshá i Harkaran. By Munshi Nizám Uddin. Bombay, 1850, 8vo.—BY THE AUTHOR.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of April, 1850.—BY THE DEPUTY SURVEYOR GENERAL.

The Oriental Baptist, Nos. 41-2.—BY THE EDITOR.

The Upadeshaka, Nos. 41-2.—BY THE EDITOR.

The Oriental Christian Spectator for April, 1850.—BY THE EDITOR.

Calcutta Christian Observer for May and June, 1850.—BY THE EDITOR.

Exchanged.

The Athenæum, Nos. 1165-7-9-70-71-72.

Purchased.

The Kádamvari, edited by Pandit Madanmohan Tarkalankár, Vol. II. Calcutta, 1850, 8vo. 5 copies.

The Annals and Magazine of Natural History, No. 27.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of May, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky
		Of Mer.	Of Air.	W. Bulb.				Of Mer.	Of Air.	W. Bulb.				Of Mer.	Of Air.	W. Bulb.		
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.717	79.4	80.2	78.2	S.	Cloudy	29.770	90.0	89.5	82.0	S. S. W.	Clear	29.743	93.0	92.3	82.4	S. W.	Clear
2	.767	80.0	80.3	77.2	S.	Clear	.813	89.9	89.3	80.8	S.W.sp.	Ditto	.775	94.0	93.6	81.2	S.	Ditto
3	.781	79.8	80.0	77.6	S.	Clear	.838	89.1	88.7	79.3	S. sharp,	Cumuli	.825	92.0	91.9	79.2	S. sharp,	Ditto
4	.737	79.4	80.0	77.2	S.	Cumuli	.798	88.7	88.0	79.7	S. sharp,	Ditto	.737	91.4	91.0	81.4	S. W. sp.	Cumuli
5S	.681	81.3	82.0	76.8	S. W.	Cloudy	.716	90.0	89.3	80.3	S. W.	Clear	.673	92.8	92.3	81.7	S. W.	Clear
6	.640	80.0	80.3	76.8	S. W.	Clear	.693	88.5	88.0	81.2	S.W. sp.	Cumuli	.655	91.7	91.3	83.0	S. sharp,	Ditto
7	.592	80.4	81.2	79.5	S.	Scattered clouds	.635	90.4	90.2	81.3	S. W.	Cirro-strati	.602	96.7	96.0	79.8	S. W.	Cirro-strati
8	.640	81.2	81.8	79.5	S. W.	Cirro-strati	.700	91.8	91.0	83.2	S. W.	Clear	.689	97.2	96.6	84.2	S. S. W.	Clear
9	.675	81.4	82.2	79.5	S.	Cumuli.	.722	91.3	90.7	82.8	S. S. W.	Cumuli	.689	95.4	95.0	83.2	S.	Ditto
10	.679	81.9	82.0	79.0	S.	Cirro-cumuli	.730	91.2	90.0	81.4	S.	Cumulo-strati	.716	94 2	93.7	82.8	S. W.	Cumulo-strati
11	.705	77.0	77.5	74.8	S. E.	Cirro-strati	.773	90.7	89.7	80.8	S. W.	Ditto	.748	94.5	96.3	81.8	S. S. W.	Cumulo-strati
12S	.754	79.4	79.6	79.0	S.	Cumuli	.784	91.4	90.5	80.8	S.	Cumuli	.749	94.4	93.8	81.8	S. W.	Clear
13	.717	81.5	82.2	79.8	S.	Ditto	.761	93.0	91.8	81.5	S.	Ditto	.720	96.2	95.5	81.5	S.	Ditto
14	.675	81.5	82.0	79.6	S. E.	Clear	.717	93.2	92.2	82.4	S.	Clear	.689	98.0	97.4	83.0	S.	Ditto
15	.682	81.2	81.8	79.2	S.	Cloudy	.701	93.3	92.0	81.4	S.	Ditto	.682	97.0	96.2	82.7	S. W.	Ditto
16	.635	81.5	82.0	80.0	S.	Clear.	.679	93.3	92.5	83.0	S. W.	Cirro-strati	.666	95.8	95.2	84.0	S. sharp,	Ditto
17	.673	82.1	82 6	80.2	S. S. W.	Cirro-cumuli	.735	95.0	93.8	81.5	S. W.	Cirro-cumuli	.727	97.3	96.2	80.8	S. W.	Ditto
18	.762	81.9	82 2	80.0	S.	Ditto	.811	94.3	93.3	83.5	S. S W.	Ditto	.805	95.8	93.8	81.3	S. W.	Cloudy
19S	.827	81.2	81.8	79.3	N. W.	Ditto	.866	93 3	92.7	81.5	S. W.	Ditto	.840	97.0	96.2	83.0	S.	Cumuli
20	.834	81.8	82.0	79.4	S.	Clear	.854	90.8	91.0	80.6	S. W.	Cumulo-strati	.805	95.2	94.7	82.5	S. W.	Ditto
21	.734	81.0	81.7	79.4	S.	Ditto	.796	93.7	93.0	81.2	S.	Cumuli	.750	96.4	96.2	80.3	S. W. sp.	Clear
22	.732	81.6	82.2	78.2	S.	Cumuli.	.819	91.7	91.2	81.0	S.	Ditto	.782	95.6	94.8	80.9	S. sharp,	Cumuli
23	.779	81.8	82.2	78.3	S.	Cloudy	.853	89.0	88.9	79.8	S.	Cloudy	.808	91.4	91.7	80.3	S.W. sp.	Cirro-strati
24	.762	82.1	82.8	78.4	S.	Cumuli	..	..	..	..	....	....	..	..	..	..	....	....
25	.697	83.8	84.4	79.8	S. W. sp.	Ditto	.717	92.1	91.9	82.2	S. W.	Cumuli	..	..	..	..	....	....
26S	.682	76.2	76.2	74.2	N. W.	Cirro-strati	.722	90.3	90.2	80.0	W.S. W.	Cumulo-strati	.691	94.9	94.7	84.0	S.	Cumulo-strati
27	.687	81.9	8.24	80.3	S. E.	Ditto	.717	92.0	91.0	82.8	S.	Cumuli	.698	97.3	96.0	83.5	S.	Cumuli
28	.721	75.3	75.7	72.2	W N. W.	Ditto	.739	89.2	88.0	75.3	N. E.	Clear	.709	93.0	92.7	79.8	N. E.	Cirro-strati
29	.641	82.8	83.3	80 9	S. W.	Scattered-clouds	.674	92.4	92.2	82.1	S. W.	Cumulo-strati	.632	96.5	96.3	82.0	S.	Cumulo-strati
30	.642	78.4	79.2	77.2	E.	Cloudy	.676	84.8	84.2	80.2	E. N. E.	Cloudy	.667	88.4	87.0	80.0	N. E.	Cloudy
31	.648	78.0	78.3	77.0	E.	Cirro-strati	.674	90.4	87.8	81.3	E.	Cumuli	.659	93.8	92.4	82.0	N. E.	Cumulo-strati
Mean	29.706	80.5	81.0	78.3	....	.....	29.749	91.2	90.4	81.2	....	.....	99.722	94.7	94.2	81.9	....	.....

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	Wind. W. Bulb.		Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	Wind. W. Bulb.		Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	Wind. W. Bulb		Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. 40. Upper.	Feet. 4. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.693	94.1	93.3	82.0	SWsp.	Clear	29.678	93.3	92.2	81.0	ssw sp.	Clear	29.679	87.2	87.0	81.8	S.	Clear	95.3	87.7	80.0	104.6	..	..		1
.718	95.0	93.7	83.3	S. W.	Ditto	.693	92.7	91.2	82.2	S.	Ditto	.703	86.2	86.0	80.9	S.	Ditto	96.2	88.4	80.5	106.4	..	..		2
.731	93.6	92.6	81.6	S. sp.	Ditto	.709	93.0	91.5	80.7	SS.W.	Ditto	.717	86.7	86.8	79.2	S. sp.	Cirro-strati	94.9	87.4	79.9	104.0	..	..		3
.662	92.0	90.6	81.7	SWsp.	Cumuli	.662	89.9	89.0	80.2	SWsp.	Cloudy	.647	87.3	87.0	80.0	S. W.	Cloudy	92.9	86.4	79.8	102.0	..	..	☾	4
..	..	..	..	....	....	.586	92.0	91.0	80.3	S.	Cirro-cumuli	.637	88.9	87.5	80.2	S. W.	Ditto	94.6	88.2	81.7	103.4	..	0.80		5
.584	93.3	92.2	83.5	S.	Cumuli	.558	91.9	90.5	83.2	S.	Clear	.564	87.3	86.8	81.0	S.	Cl. to the NW.	95.6	85.3	75.0	105.4	..	..		6
.560	98.4	97.2	81.2	S.	Cirro-strati	.540	98.3	96.8	81.3	SS.W.	Ditto	.552	90.0	89.0	80.3	S. sp.	Cirro-strati	99.6	90.4	81.2	111.3	..	..		7
.625	101.0	99.2	82.5	S. W.	Ditto	.582	100.2	98.2	83.0	S. W.	Cirro-strati	.594	92.2	91.2	82.2	S.	Clear	102.0	91.9	81.8	115.8	..	..		8
.635	96.3	95.3	83.9	S. W.	Cumuli	.598	95.0	93.2	81.7	SS.W.	Clear	.608	88.4	88.0	81.0	S.SW.	Cirro-strati	97.8	89.9	82.0	107.0	..	..		9
.647	96.0	95.1	83.0	S.	Ditto	.633	94.5	93.0	82.2	S. W.	Cumuli	.661	90.0	89.2	80.3	S.	Cloudy	97.4	89.8	82.1	107.9	..	..		10
.692	96.2	95.2	82.0	S.	Ditto	.644	96.2	94.0	80.8	S.	Ditto	.691	90.0	89.3	80.0	S.	Cirro-strati	97.0	86.4	75.8	109.7	..	..		11
.680	95.2	94.5	82.6	S.	Clear	.658	94.0	92.2	82.3	S.	Ditto	.667	88.0	87.4	80.4	S.SW.	Cirro-cumuli	96.8	87.9	79.0	106.7	..	..	●	12
.658	97.8	97.0	..	SS.W.	Ditto	.638	96.1	94.0	80.5	SS.W.	Clear	.621	90.0	89.3	80.3	S.	Clear	99.0	90.6	82.2	111.4	..	..		13
.615	97.0	95.5	83.9	SWsp.	Cirro-strati	.610	95.3	93.4	83.0	SWsp.	Cv .to the N.E.	.661	85.0	84.8	73.3	ES. E.	Cloudy	100.4	91.1	81.8	110.5	..	..		14
.634	97.3	96.0	82.2	SWsp.	Clear	.595	96.2	94.3	82.4	SWsp.	Clear	.598	89.0	88.3	81.5	S.	Cirro-cumuli	98.9	90.3	81.7	109.3	..	..		15
.617	98.6	96.4	82.8	SS.W.	Cirro-cumuli	.582	97.1	95.1	82.3	SS.W.	Ditto	.582	91.0	90.6	82.7	S. sp.	Ditto	99.7	90.9	82.0	111.0	..	..		16
.688	99.7	98.3	82.0	SS.W	Cirro-strati	.673	99.3	97.2	82.7	S.	Cirro-strati	.673	93.0	91.8	81.8	S.	Clear	100.7	91.6	82.5	111.3	..	..		17
.745	99.2	98.6	82.2	S.	Ditto	.716	100.0	97.8	81.4	S.	Cumulo-strati	.727	91.8	91.0	81.4	SS.W.	Ditto	100.9	91.5	82.1	113.3	..	..		18
.770	98.3	97.0	83.2	SS.W.	Clear	.746	97.9	95.8	80.0	S.	Clear	.711	91.3	90.2	79.6	S. W.	Cl. to the NW.	100.0	90.9	81.7	110.2	..	..	☽	19
.729	96.7	95.8	81.6	S. sp.	Ditto	.694	97.0	95.0	78.0	S. sp.	Ditto	.694	91.0	90.3	79.4	S.	Cirro-strati	98.1	87.2	76.3	108.8	..	..		20
.675	99.0	97.0	81.0	S. sp.	Cumuli	.656	96.8	94.8	80.6	SS.W.	Ditto	.673	88.9	88.2	79.6	S.	Cumuli	100.5	91.1	81.6	111.0	..	..		21
.711	98.2	97.0	81.9	S. sp.	Clear	.672	96.9	95.3	80.8	S. sp.	Ditto	.676	89.5	88.2	80.1	S. sp.	Cirro-strati	99.8	90.9	82.0	109.3	..	..		22
.739	94.8	93.9	80.0	ssw.sp.	Cirro-strati	.709	93.9	92.4	80.3	S. sp.	Cumuli	.721	89.2	88.8	78.3	S.	Cl. to the W.	96.0	87.4	78.8	104.6	..	..		23
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	98.0	90.1	82.2	..	..	..		24
..	..	..	..	....	....	..	..	..	..	....	....	..	..	..	..	....	....	99.0	91.3	83.6	..	..	0.50		25
.618	95.2	94.4	82.2	S. W.	Cumuli	.614	94.7	93.0	82.0	S.	Cumuli	.599	90.0	89.0	81.2	S.	Cirro-strati	97.0	85.9	74.8	109.5	..	..	⊙	26
.615	100.2	99.0	83.2	S.	Cumulo-strati	.574	98.0	96.4	82.0	S.	Ditto	.617	93.3	92.4	82.2	S.	Cloudy	100.8	91.3	81.8	115.3	..	0.42		27
.612	97.3	96.5	81.3	S. E.	Cirro-strati	.570	98.8	96.1	81.0	S. W.	Cirro-strati	.569	94.0	92.2	81.2	S. W.	Cirro-strati	99.0	87.3	75.6	115.9	..	..		28
.585	88.0	83.6	76.3	E. sp.	Cloudy	.636	80.6	80.0	75.0	E. sp.	Cloudy	.621	78.8	78.3	75.5	N.N.W.	Rainy	99.0	91.4	83.7	113.6	..	0.16		29
.608	94.8	92.7	80.6	ENE.	Nimbi	.597	78.7	78.8	75.0	E.	Rainy	.605	79.9	80.3	77.0	E.	Cloudy	94.3	86.0	77.7	111.0	..	1.08		30
.624	80.9	79.3	75.3	S. W.	Rainy	.615	79.2	79.7	77.3	S. W.	Very c. drizzly.	.643	78.0	78.2	76.3	N.N.W.	Drizzly.	96.4	87.4	78.4	115.5	..	0.34		31
29.659	95.9	94.5	81.7	....	....	29.636	93.4	92.5	80.8	....	....	29.646	88.4	87.8	80.0	....	....	98.0	89.2	80.3	109.5	..	3.30		

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JOURNAL

OF THE

ASIATIC SOCIETY.

No. VI.—1850.

Report on the Valley of Spiti; and facts collected with a view to a future Revenue Settlement.—*By Captain* W. C. Hay, B. A., *Assistant Commissioner, Kulu.*

Approaches to the country.—I gather from information that the valley of Spiti is approachable from our own territories and Kunnáwar, by six different routes.

First Pass.—First, and easiest, is through Kunnáwar, viâ Shiálkar, over a low range of hills by the Kíágar pass to "Súmráh," the last village in the Busahir territory, and thence across the Spiti river to "Lári," the first village in Spiti. By this route you meet with three mountain passes; viz. the "Warang," between "Chuni" and "Lupá" in Kunnáwar, which is 13,000 feet high; the "Runang," 14,508 feet, between Kannar and Súngnam in Kunnáwar; and the "Húngrúng," 14,837 feet, between "Súngnam" and "Hungo,"—and have to cross the Spiti river which is not bridged; rapid, and 3½ feet of water.

Second pass Mánirang.—The second is over the "Máni" pass, commonly called the "Mánirang;" but "rang" merely signifies a pass. The road to this is from "Súngnam" in Kunnáwar, to "Robak" where copper mines are worked by the Busâhir Rájá; then over the pass, which Captain Gerard, I think, calls 18,000 feet to "Máni," a village in Spiti, and one march from Dankar: this pass

is not open until May, and closes usually in October. The "Mání" pass bears from Dankar East 46; there are two very high peaks above the pass, and a lake called "Mání-ke-Choh."

Third Pass "Bhubáh."—The third pass is the "Bhubáh Jhote." The road to this jhote strikes off from the Sutlej at the Waugtú-bridge, ascending to the village of "Gutgáon" in the Pargannáh of Bhubáh in Busáhir; thence the pass is two marches from any habitation: it is a high pass, probably near 18,000 feet; you cross it and descend to the village of "Múdh" in Spiti, only one march. This is by far the shortest road to Rámpúr; but the pass is only open from May until October. I contemplated coming to Spiti by this route, but snow fell for four days successively, and I gave up the intention. Two Spiti men afterwards tried it, and had to march unceasingly for two days in 3 feet of snow, and one man was frost-bitten; it is certainly impracticable for Hindustanís in November.

Fourth Pass "Satoláh."—The fourth pass is the "Satoláh," which leads into Kúlú, entering it at "Jagat Súkh;" by this pass you have to pass the Shigri; the marches are as follow:

From Dankar to Kurjeh, 1
Pámo, 2 in Spiti.
Lohsar, 3
Kúnzam ghat, on this side 4.
Shigri Ghátí, 5.
Sutlehhet, 6.
Gúnzú Pattar, 7.
Jagat Sukh, 8.

In this route, it is said, there are three streams to pass, which are impracticable for Ghoonts, and only open from May until October.

Fifth Pass "Kanzum."—The fifth pass is "Kanzum Lámú." "Lámú" signifies pass: this leads into Kulu, viâ the Rotang pass, and is only open from May until October.

Sixth Pass "Bará Lachá."—The sixth pass is the Bará Lachá, viâ Láhoul and the Rotang pass. The marches to Lohsar are as at the fourth pass, thence to Takpokongyah to Bara Lachá, &c.:—Only open from May to October.

These are the passes from our own Territories and Busáhir, through the outer chain of mountains.

Passes into Tartary.—Through the second chain of mountains into Ladak and Tartary, there are three passes.

1*st to Chúmúrti.*—The first from Lári to Chúmúrti in Tartary; the marches are as follow, being six days' journey.

All these places are beyond our frontier.

1st, Húling.
2nd, Súng-kill.
3rd, Tún-tún.
4th, Pút-pút (lámú) said to be a very high pass.
5th, Rúm-búding.
6th, Chúmúrti.

2nd Pass into Tartary—"*Párang.*"—The second pass is over the "Párang" lámú, upwards of 16,000 feet, and goes by the villages of "Ki Gúmpá" and Kibar to Rúksú, a district in Ladak. This is usually called the "Párang Lá," Lá being the contraction of "lámú" a pass.

3rd Pass into Tartary—"*Tungling.*"—The third pass is over the "Tungling" lámú, a very high pass, also leading to Rúksú, and the road strikes off between the villages of "Hall" and "Qatu," but on the opposite side of the Spiti river.

These are all the passes through the mountains into Spiti that I have as yet become acquainted with.

Boundaries.—The boundaries of Spiti are as follow. It is bounded on the North by the Párang range, which separates it from Ladak. To the North East there is no defined boundary, but inaccessible mountains.

To the South and South East by the Máni pass ranges which separate it from Kunnáwar.

To the East a valley, called "Kurati" takpo, separates it from Chinese Tartary.

To the West, the snowy range from "Bhubáh" to "Bará Lachá," Bhubáh Jhote, separating it from Busáhir, and the latter from Kulu, and Lahoul. The Bhubáh Jhote is to the W. S. W. and the Bará Lachá N. W. These appear to be all natural boundaries.

Valleys.—The length of the Spiti Valley, longitudinally, I should estimate at about sixty-six miles; the following being my supposed distances between each place situated in the valley. From the boundary

before reaching	Lári, ...	6 miles.
From Lári to	Po, ...	8
	Dankar, ...	10
	Lidang, ...	6½
	Kíü Sing, ...	4½
	Rangrik, ...	5
	Ull, ...	10
	Hansi, ...	10½
	Lohsar, ...	5½
	Total,..	66 miles.

There are three transversal valleys, one in the direction of the curved line of mountains extending from the Bará Lachá to the Bhubáh pass. The length of this valley to which villages extend may, from the Spiti river to the village of "Múdh," be estimated at 30 miles.

The second transversal valley extends from the Spiti valley, in the direction of another curve of high mountains, separating the Spiti valley from Tartary, and whence arise another line of water heads; the rivers running in an opposite direction. The inhabited part of this valley does not extend above ten miles. From this again, is a lateral valley, running almost parallel with the Spiti, in which are only two villages in about three miles.

A third transversal valley is the "Párang," leading up to the "Párang pass" into Ruksu, or Ladak; in this there are only two villages in about two and a half miles. These may be said to contain the inhabited and cultivated parts of Spiti.

The passes through these valleys I have already mentioned.

Crops.—The crops in Spiti consist of two kinds of barley, one of wheat, peas, and mustard from which oil is made. They sow in May, and reap in September.

Rivers.—The principal river is the Spiti; I followed it up as far as "Lohsar," where it divides into two branches, one called "Pílú" running from the North West, and another flowing from the "Kúnzam lámú," and called "Líchú" from the South West, and said to be four days' journey.

The peculiarity of this river is the immense width of its bed, being (from the time it takes a South and South East direction, where the

"Párang" river enters it, to a point where another stream flows into it from the "Máni rang") seldom less than half a mile wide, and, in some parts, nearer a mile.

At this season of the year, the main stream is not in most places above forty yards wide, or above three feet deep,—that is above Dankar. This river is also remarkable for its very flat bed, and for not containing boulders of any large size—none above a foot in measurement, but much more generally small stones, gravel, sand, and a calcareous marl.

Its principal tributaries are the "Tungling," "Párang" and "Lingti" flowing into it from the left bank; and the river "Peen" on the right.

The "Tungling" and "Párang" flow from mountains of the same names, each source distant about 20 miles.

The river "Lingti" flows from Lúngpá: it is said to be two days' journey, and above the village of "Lílong" it is called the "Pedangehi;" its bed is about eighty yards, and the stream at present is about 20 feet wide.

The river "Peen" is said to flow from the "Bhubáh" Jhote and above takes the name of the "Bhubáh." When the river takes a S. W. direction it is joined by another considerable stream, the "Yensá," flowing from a mountain of that name two days' journey from its junction with the "Bhubáh." Another large stream then joins the "Bhubâh" called "Para Kiö," which is said to flow from a mountain of that name four days' journey; its course appears to be nearly South. The "Bhubáh" then takes the name of "Peen" from the Koti of "Pínú," or valley, through which it flows. The width of this river bed is from 300 to 800 yards.

There are many other feeders to the Spiti, but which may be more appropriately termed torrents, principally running into the Spiti, on its right bank, with a course from the mountain, through which they have forced their way, of about half a mile: some of their beds are very remarkable, from 300 to 500 yards wide, quite straight and parallel, like the banks of a canal, and the débris, in some instances, from 200 to 300 feet above the water level: the rush of water on the melting of the snow, must be very great through these channels. The Spiti river is, at this season of the year, in some parts completely frozen over, and you can both hear and see the stream flowing beneath

the ice. A great quantity of border ice is frequently broken up and carried down the stream, which occasionally gets jammed, and the passage is interrupted; the river above then increases in depth, and becomes impassable.

The bed of the Spiti is so deep as to prevent its water being of any assistance to the people in cultivating; they depend entirely upon the small streams from the mountains feeding their kools. On the right bank of the Spiti are immense beds of débris, forming plateaux of sometimes two miles in length, and from half to one mile in breadth; a quantity of calcareous deposit has taken place upon the débris, and would afford excellent arable ground, but for its aridity, and impossibility of conducting courses to water it: in some seasons when a great abundance of snow has fallen upon the range of mountains immediately above the level ground, cultivation is attempted, but it is very uncertain, and in taking revenue from the country, it cannot be accounted as productive soil.

The probable total length of the Spiti river, from its source to its junction with the Sutlej, may be estimated at one hundred and twenty miles. I am told that fish have never been seen in the Spiti river.

Geological Formation.

Physical and General view.—The Physical and Geological account of this country, such as I am able to give, can be embraced in a small compass. The account of the mountains, valleys, and passes will, in fact, explain the physical position.

Gypsum and Alum.—The formations that I have seen, belong wholly to the secondary period: in fact, Spiti may be described generally as being of various kinds of lime and sandstone, with a few slates and shales, and conglomerates. On descending to the bed of the Spiti, after crossing the range which separates it from Kunnâwar, beds of red sandstone are first met with; in connection with these, below Láre is gypsum, and alum; and, from the water all the way from Láre to Dankar being saline, I have no doubt but that rock salt may be discovered in the vicinity of the gypsum.

Fossil beds.—These secondary strata contain some excessively interesting fossil beds. The first which I examined are in the Pínú valley, and above the village of "Mekiön;" they are a marine deposit, and

belong to the "Porkilitic" group, being situated between the beds of "lower new red sandstone" and the Magnesian group or dolomitic conglomerate; these again being associated with beds of shale, and mountain lime-stone, point it out as an exceedingly likely locality for coal; the snow however was on the ground and the Thermometer not above 10° in the middle of the day, when I visited the place, so that my observations were unsatisfactory.

The fossil beds of Ammonites are of great extent, varying from the size of a cart wheel, to an inch in diameter: in a very short time I collected as many as two men could carry, and could distinguish as many as six or seven different species of Ammonite, with a variety of other shells, and one or two vertebræ of fish.

Oxide of Iron.—A large quantity of red oxide of iron is found somewhere in the vicinity, which is used by the people for ornamenting their houses, marking their sheep, &c.; this locality, when free from snow, would be worth observing, because beds of this description often overlay silver and lead ores.

Lias and lower Oolitic beds.—The other fossil beds, which I examined, are in one of the lateral valleys near the village of "Gienmul." The formation corresponds with our well known "Lias," and "lower oolitic" reposing on the Lias. The mountain, behind which these beds are situated, is composed of a series of calcareous and sandstone beds, in an almost undisturbed position.

The decomposing Lias, with much indurated mud or clay, and greatly tinged with iron, have greatly the appearance of a coal field, and are on undulating hills; these are filled with ammonites of only one species: the decomposition of this group furnishes the richest ground in Spiti; the soil at "Lidang" and "Lárá" seems also to be of this description, but the fossils are not so abundant. The lower oolitic reposes on the Lias, and is composed of rather complicated strata, containing immense quantities of dead shells in a black deposit of extreme fineness; this clay is perhaps an indication of the neighbourhood of coal. I procured a quantity of these fossils, consisting of a variety of bivalve shells, one or two univalves, and varieties of Belemnites and "Orthoceras."

The mountain lime-stone is the most abundant formation in Spiti, and abounds with species of ammonite, Orthoceras, Spirifer, Ters-

bratulæ, &c. &c.; some of these beds may perhaps be attributed to the primary fossiliferous or "Silurian" group, since they are in a horizontal position, and have never been disturbed since their deposition, and they are a dark gray argillaceous deposit, below which a slaty sandstone is met with; the fossils generally being, "pentamerus," "tentaculites" ammonites and belemnites—all indicative of the Silurian group.

Soil.—This brief description will so far tend to show that the productive soil of Spiti, is in general calcareous. As far as Lidang it is of a light colour; from Lidang to Kí, the soil is blackened by the fossils; and above these places, to the head of the valley, the soil assumes a reddish appearance, from the calcareous soil being more or less mixed with the decomposing siliceous particles of red sandstone.

These soils are all light, and easily turned up by the plough, and should, if properly watered, be highly productive.

Secondary Strata.—It is a fact to be noted, that Herbert in his mineralogical survey of the Himálaya, travelled as far as the Hungrung pass in Kunnáwar, and leaves it with a remark, that lime-stone is never, in these mountains, a principal formation: now, the principal lime-stone formation is only there beginning, the whole of Spiti may be said to be a lime-stone formation; likewise, a great part of Lahoul. Herbert also says, after mentioning the formation of gneiss, &c., that "outside of the whole are very limited examples of the secondary strata." Now the secondary strata are of great extent, but not as observed by him. The secondary strata begin at the Hungrung pass, which is a mere spur from higher mountains, chiefly composed of lime-stone and sandstone, as the boulders in the river at Súngnam might have pointed out, but he merely sighted the lime-stone, and drew, in my opinion, an incorrect conclusion.

The Bará Lachá, and many other mountains from 16,000 to 20,000 feet high, are secondary, although certainly very uncommon height for secondary formations: and it will be a natural conclusion that nearly the whole range, bounding the Tartar plains in this direction, are secondary or certainly not older, which would give as great a breadth of secondary as primary formation.

Population.—The five Kotis into which Spiti is divided contain upwards of sixty villages, enumerated in Table No. 1. The whole of

these villages contain only three hundred and sixteen houses, and their population is as follows, the census being from actual enumeration.

Adult males, - - - -	392
Boys under 12 years, - - - -	191
Adult females, - - - -	593
Girls under 12 years, - - - -	238
Lambas or priests not included above, - -	193
Total, -	1,607

giving a total of one thousand six hundred and seven souls.

The population is represented to me as having been on the increase for the last five years.

Revenue.—It is not without some difficulty that I got the people to make me acquainted with the revenues which had been formerly paid, but I believe the following to be pretty correct.

Revenue for 1847-48-49.—The revenue for the years 1847-48-49 has been paid to the Vazir of the Rájá of Busáhir—at least for 1847 and 1848; that for 1849 was tendered to the Vazir, who has since written to me to receive it on account of Government. The revenue paid to Mansúk Dás, the Vazir of the Busáhir Rájá, in 1847, was merely 753 rupees.

In 1848, the same sum was paid, with the addition of 400 lacs* of grain, the produce of some land at Dankar, which was called Sircári.

The revenue for 1849 is still in hand, and is 753 rupees and 500 lacs of grain, now in the fort of Dankar, which will be made over to the Vazir of the Rájá, and 753 rupees, credited to Government.

Mansúka Das, Vazir, made an offer to Mr. Edwards, the Superintendent of hill states, to continue farming Spiti, upon an increased rent of 1,000 rupees, and I believe he recommended to the Board that his offer should be accepted; but I think it very objectionable, for the Spiti people believe that he only took the sum fixed for the three years, with a view of obtaining a longer lease, when they were apprehensive that it was his intention to exact more from them.

The Spiti Vazir holds a paper, written in Thibetan, signed by the late Mr. Agnew, which the people here say is guaranteeing to them that no more than 753 rupees should be levied from them. I have no means

* See page 440.

of testing the truth of their assertion, nor do I know whether Mr. Agnew was authorized to make such an agreement, but I have treated the subject lightly, nor could they have considered it very binding, from the fact of their having paid to Mansúka Dás, in excess of the 753 rupees, grain to the value of 200 rupees or upwards.

Revenue for 1844-45-46.—In the years 1844-45 and 46, the annual revenue paid to the Thánádár at Ladak was 1,031 rupees. Besides this, 100 "Múndís" or iron crow-bars; likewise two Ghoonts, and a nazaráná of 15 rupees annually to the Thánádár, and 60 sheep in jugat.

During these three years the Seiks are said to have further plundered the country of 4,000 rupees, also 60 ghoonts, and much other property.

Revenue from 1839 *to* 1843.—From 1839 to 1843, both inclusive, an annual revenue of 2,000 rupees was paid to Rájá Goláb Singh. Besides this, 100 sheep within the five years; and, in 1839, three Ghoonts were presented as nazzars, and one Ghoont annually for the four succeeding years.

Prior to 1839.—Before 1839 the revenues from time within memory, was always paid to the Rájá of Ladak, as follows; 396 rupees in cash, 200 lacs of grain, 100 múndís, 34 pieces of cloth (Barmúr), and 132 shúgús of paper, equal to 660 Hindustáni táktehs. During these years, they also paid annually to the Rájá of Kulou, six rupees, and two pieces of cloth, as tribute. Also to the Rájá of Busáhir 30 pieces of cloth as tribute. And to China (from 50 Chinese families settled in Spiti) about 200 lacs of grain.

This revenue to China has been discontinued for the last 12 years; but, before my arrival, some Chinese were sent from Tolung to demand the ancient tribute.

Demands of the Chinese for revenue.—Since my arrival, Vakíls have been sent to me from Tolung and Chúmúrtí, setting forth their claim to this tribute, but I told them that, as it had not been paid for the last 12 years, and the Company had the means of protecting their own subjects, that I did not think it would be continued; but that as I was not vested with political authority, I would make their request known to my superiors.

This ancient tribute does not appear to have originated with the

Chinese government, but in ancient times there were Tartar hordes upon the border, and the Spiti people appear to have paid this grain to be protected from plunder.

Revenue how hitherto collected.—The revenue of Spiti has hitherto been collected by a Vazir (hereditary); whatever revenue is required has been levied equally from the five Kotis: in the collection, he is assisted by five "Gatpos" or Múkíáhs. The Vazir has hitherto been allowed to pay himself at the rate of one rupee in four, and he holds the village of "Kiúling" in Jághir.

Amount of grain produced, and probable home consumption.—The whole five Kotis contain 2,554 lacs of ground. The probable produce of this land will be 20,667 lacs of grain, and the probable annual home consumption 15,000 lacs; which, deducting 800 lacs for the produce of the Jághir lands, will leave them 4,867 lacs to pay their revenne with; which, roughly calculated, would be about 1,600 rupees, besides the sale of Ghoonts, say 400 rupees, and any tax upon their industry.

Commerce.—The Spiti people are not essentially traders, their country affords but little pasturage, and they have seldom more sheep than to supply their own wants.

Exports.—The exports are confined to grain and a few Ghoonts, together with a few manufactured blankets, and pieces of Barmúr cloth. The return for their grain is salt, and wool. For grain they receive equal weight of salt, and for three lacs of barley they receive eight "kiris" of wool; the kírí is a Chinese weight, and differs from 12 to 16 seers.

Trade with Chinese.—The Chinese are their own carriers: they come to Spiti in November, and take about 1,000 lacs of grain, and a few Ghoonts. The Spiti people say that this trade might be increased. The Chinese do not barter "pashm" or Shawl wool, but take rupees for it.

From the Chinese, the Spiti people buy their sheep, (a very fine description) giving five lacs of grain for one sheep.

Trade with Busáhir and Ladak.—They export to Busáhir about 250 lacs of grain, chiefly to Súngnam, and receive in exchange rupees: the Busáhir people are their own carriers: a few Ghoonts are also sold. To the Busáhir people they also exchange part of the salt they

receive from China, for iron and tobacco, and a small quantity of pashm, about 12 maunds, is also exchanged for iron: if this iron is more than sufficient to supply their own wants, they trade with it to Ladak, or Rúksú, and exchange it for ornaments for their women, and other trifles.

They also exchange about 250 lacs of grain with the Tartars, from Rúksú, for wool and salt.

The usual selling price of grain amongst themselves appears to be from 2½ to 3 lacs of barley, and 2 lacs of wheat for the rupee.

This appears to be their entire trade.

Weights and Measures.—Their measures are of three descriptions, "linear," "agrarian," and of solidity.

"*Linear.*"—By the linear measure, cloth is sold by the "háth" as in Hindustan. Wool is sold by what is called a "kírí" or bundle, which differs as to weight, but is two háths in length; this is used in commerce with the Chinese.

Agrarian.—The agrarian measure estimates by the quantity of grain; in Kulu it is "Bhars," here it is by "lacs," a lac being 32 catchá seers, or 12 pucka seers.

Capacity and Solidity.—The return of grain sown is 14 to 1 of barley, and from 10 to 12 for 1 of wheat. Gram is sold by the seer of 20 double pice weight; our seer is from 80 to 84 tolas, their seer is 32 tolas.

They have also a small measure called a "Máni" or "Thi," which is a small wooden cup; this is of two sizes, the one used for buying, called "Chayreh," holding 29 rupees weight of grain; and the other, by which they sell, called "Guyreh," which only holds 21 Rs. weight; small articles of value are bought and sold by the barley-corn weight, as a grain of rice is used in Hindustan.

Liquor.—Liquor is measured by the "Puttah" of 2 seers, equal to ¾ seer pucka. Their liquor is of one kind, distilled from barley called "Chung," and is sold 30 "puttahs" for the rupee. They consume large quantities, and one man is said to drink, on occasions of festivity, as much as four puttahs.

Domestic Animals, Cattle, &c.—Their animals consist of Yâks, Jabbús or half Yâks, Cows, Ghoonts, Asses, Sheep, Goats, Dogs, and Cats.

Yáks.—The Yâk is a highly useful animal; with it they plough, carry loads, and it furnishes milk, and hair for their ropes.

In the severest weather, this animal appears to enjoy itself in the snow, and it is often to be seen with icicles, of several inches in length, hanging to its nose, and a foot or more of ice hanging to the hair falling from its neck and shoulders. Long hair hangs over the eyes, and prevents their freezing.

Number of Yáks, Jabbús, Cows and Ghoonts,—Chinese breed. The total number of Yâks in Spiti is 439: and of Jabbús and Cows 412. The Ghoont, although an useful animal, seldom carries any burden but a man; the total number in Spiti is 665, but bred chiefly for sale. They have two breeds, one a small Ghoont, never above 12 hands high, peculiar to the country. The other a large breed of Ghoonts, from 13 to 13½ hands high, is bought from the Chinese, and usually comes from "Chúmúrtí." For a Chinese Ghoont two years old, they give a four year old Spiti Ghoont. All are equally hardy, and are kept out the whole winter,—all except the yearlings, which are housed. During winter, the Ghoonts live entirely upon the roots of stunted bushes, and are very expert at scraping the snow from off them with their fore feet.

But little attention, except in a few cases, is paid to the breeding of these Ghoonts; a certain number of entire Ghoonts are turned loose amongst the mares, and the sire of a foal is seldom known. Such as are not required for breeding, are castrated when between two and three years of age.

The right of castration has usually been the right of one person, given under a seal from Ladak.

The breed of Ghoonts with a little care might be considerably improved. Many are killed during winter by wolves and leopards, and I saw some which had been much lacerated, but escaped.

Asses.—The ass is also an useful animal, and is of a peculiarly strong breed, not in general large, but with powerful limbs; they are chiefly employed to carry firewood, and are said to be able to go wherever a sheep can: their milk is also drunk. The total number in Spiti is 79.

Sheep and Goats.—The sheep appear to be of two distinct breeds; the common one produces the fine "Biánghy" wool, the other is

a very large species which is brought from "Chúmúrtí" with very long wool, but not so fine as the other.

The goat is of the description which produces the Shawl wool or pashm. The total number of sheep and goats in Spiti is 1095.

The Spiti people are not carriers, or they would have a larger number of sheep. Each village has its three or four dogs, and a very fine black species of cat: these I think comprise all their domestic animals.

Zoology.—I am here at a very unfavorable season of the year to make any observations, either on the Zoology or Botany of the country; in fact, with the latter science I am unacquainted, and, with regard to the former, having been a keen observer through these mountains, I have been struck with but two new species of bird of the genera "Erythrospiza," and "Ruticilla," every thing else that I have seen is well known and described.

Physical constitution, morals, manners, &c. of the people.—The position of Spiti, situated amongst ranges of high mountains, subject to extreme cold, and far from civilization, points out in a degree the physical constitution of its inhabitants.

The Bhotiás are a physically robust cast of people, the climate not being sufficiently severe to impede the vital functions; with strongly marked weather-beaten countenances; of middling height; with muscular body, flat faces and noses, and, in general, small eyes. The natural colour of their skin is a light brown, and the reflection of the sun from the snow gives them a ruddy hue, which is so peculiar to all the race of Butan. Their hair from exposure to the atmosphere is extremely coarse and matted. The women are also very muscular, and all burdens, except in cases of extreme necessity, are carried by them, the men merely ploughing the fields. They are not subject to much disease, and live usually to 70 years of age.

Diseases.—Small-pox is their greatest enemy, which occasionally depopulates whole villages. Stomach diseases are not uncommon and which may be increased perhaps by the entire want of vegetables. Weakness of the eyes is also common. Although depending entirely on snow and ice water, and in a country of lime-stone goitre is scarcely known; one or two cases, they say, may exist in the whole country.

Ages of Marriage.—The common ages of marriage are, with the men, from 20 to 21, and women from 15 to 20.

Polyandrism.—The abominable custom of polyandrism prevails, that is, a woman marries a family of brothers.

A man in good circumstances has sometimes two or three wives; but, from the first circumstance, and the priesthood not marrying, the proportion of unmarried females is large.

Slavery unknown.—Slavery is unknown amongst them. They are free in their manners, without being rude, or inquisitive; and have a certain degree of Chinese cunning.

No interest taken for money.—They never take interest for money, but often lend and borrow amongst themselves.

Houses.—Their houses are large and well built, and generally two or three stories high. The first three feet built of stone, and the remainder of sun dried bricks, 18 inches long, 8 wide, and 6 deep, cemented with calcareous mortar. The roofs are flat, with a layer of willow or tamarisk twigs, over which is about 6 inches of earth. On the outer walls are usually deposited grass and wood for winter use, and the houses of the richer zemindars are always distinguished by the neatness with which this is stored. This keeps the snow off their walls. One room in a house is usually 20 feet square, or 24 by 20, the roof supported by a double row of wooden pillars, the architrave being, in the better houses, highly carved in Chinese style, in the form of dragons, &c. The two centre beams, are about 2 feet apart, and over these, to form a ceiling, willow or juniper sticks, pealed of their bark, are crossed, and placed close together giving a neat and cleanly appearance; this however is much destroyed by the lighting of fires in the room, and there being no exit for the smoke, except by the door and some very small windows, which are usually on only one side of the room. The walls are generally washed with a slate-colored marl, and a cornice imitated by a band of white and red, sometimes yellow, made from gypsum, and red and yellow ochre. Generally speaking they are extremely well housed. On the outside corners of the houses are usually erected poles, with a black Yâk's tail on each. The whole family live in one house, consisting usually of a grandfather and mother down to the grandson, &c.

Khatak presented, a Chinese custom.—When the parties can afford it, distinct buildings, but close together, are occupied; the grandparents occupying the second best. If they die, the father occupies

his father's quarters, and the younger couple the best. Such are their arrangements. They appear to live happily together, seldom quarrel, and crimes are very uncommon. Their customs are essentially Chinese, and I was always presented with a "Khatak," or white silk scarf, by every head of a village.

Mode of reckoning time.—Their mode of reckoning time is by lunar months of 29 and 30 days alternately, and every three years they add a month to reconcile the motions of the sun and moon. Their present Samvat (Kilú) commenced on the 15th of December.

Mode of detecting crime and oath.—When two parties are accused of crime, an oath is taken in the following manner. The names of each are written on paper or engraved on stone, then wrapped up in flour, and either thrown into hot oil, or water, a person then plunges in his hand, and the first name that comes up is considered the guiltless person.

Petty thefts punished by fine.—Petty thefts are punished by fines.

A person dying without an heir, the personal property goes to the Lambas.

Crimes how punished.—If a woman deserts her husband, and goes to another man, the man pays the expenses that have been incurred by the husband, with an occasional fine, according to circumstances.

Bad crimes, as maiming, wounding or murder, have hitherto been punished by orders from Ladâk, generally by the cutting off a hand.

Amusements.—Shooting with a bow and arrow is one of their favorite pastimes; the implements are of Chinese manufacture. A sort of religio-dramatic performance constantly takes place, the actors are Lambas, who repeat religious sentences, and are joined in a chorus by the crowd; on these occasions grain is bestowed, and every donor's name registered in a book kept in the gúmpáh or the kúrdewáráh.

Dress.—All are clothed in woollen coarse cloth and blanket at all seasons, and in winter, a goat or sheep skin cloak reaching from head to near the feet, the hair inside. The women wear a sort of loose wrapper with arms, extending to below the knee, bound round the waist with usually a red coarse shawl of pashm; loose trowsers usually red, which are gathered close below the knee, and stuffed into a pair of cloth leggings attached to a large Chinese shaped shoe, (these leggings answering for stockings,) and tied round the calf of the leg

with a woollen string. The shoe is made large and the vacuum filled with búsá or wool.

Their heads are usually bare, but they have a large moveable ornament made of brass, or sometimes of silver and gold, studded with a variety of turquoises, which extends from the forehead over the parting of the hair, and reaches in a long tail behind. They wear their hair long in a number of plaits. They also wear a variety of necklaces of amber, coral, &c.; and coral earings and wrist ornaments cut from the chalk shell. No woman is without these ornaments. The higher class sometimes wear a kind of cap made of Kimkhab and trimmed with sable fur, but these are seldom seen; a woman may be said almost always to appear with a bare head: they are in no way secluded, and are free and frank in their manners, and of very cheerful disposition.

The dress of the men much resembles that of the women, but their heads are generally covered with a sheep skin cap, or one of black blanket hanging loose, with a light blue border. Many wear their hair in one long platted tail, with, occasionally, turquoises and corals. They have all a necklace of coarse amber and other beads. They also wear, suspended round their waist, a flint and steel, and round their necks a polished piece of brass which serves as a looking glass, and various charms.

The Lambas have a variety of head dresses, but all in the Chinese style, either a cap or a hat.

Food.—Their food consists almost entirely of a sort of Sattú, made from wheat, barley, or peas. They occasionally eat meat boiled into a soup; and drink quantities of tea, boiled with butter and salt. Yâk's flesh is eaten without prejudice; but, in killing any animal they abstain from shedding blood, and usually strangle. They have no poultry; in fact I doubt if fowls would live. They have not a fruit or vegetable in their country. Turnips, which are cultivated in Kunnáwar, are not seen here. I think that cabbages and beet root might be introduced here with great advantage to the health of the people. Potatoes would not thrive, the cold being too severe. Tobacco is smoked by nearly every man, who has a pipe made of iron stuck into his cammarband, and a leather pouch for his tobacco.

Religious Institutions.—The faith of all the inhabitants of Spiti is "Buddhism." The priesthood form a large portion of such a small

population, there being nearly 200 distributed in the five Kotis. They consist of a Head Gelong, who is their guru or high priest: under him again are five other Gelongs, and all the rest are "Chunbás" and "Chelâhs." The two last or inferior orders can be made here, but a priest must go to Lahassa to be made a Gelong, by the Teshú Lambú. The "Chelâhs" are made indiscriminately from the peasantry. In Spiti there are five Gumpás or Thákúrdewaráhs, each having its Gelong. All these are under the orders of the Teshú Lambú at Lahassa. The priests must either be clothed in red, or yellow, and on no account wear white; their head dresses are very various. They are strictly prohibited from exercising any other functions but those of religion. They are entirely supported by the people, and they collect grain for their support at harvest time from the people; they have a store room to each Gumpá. The Chinese families settled in Spiti are called "Chuji," and they present annually, 200 lacs of grain to the head Gumpá. The priests are prohibited from marrying; if they do, or are known to have connexion with a woman, they are beaten and dismissed from the order. There are however two sects of Lambas; one called "Neingmá" answering to the Byrágis of Hindustan; who though not allowed to marry, are allowed to keep women; there are only 13 of this sect in Spiti.

The other sect is the "Gilopá" who represent the Sannyásies: they consider themselves defiled if they touch a woman. The "Neingmá" sect generally wear long hair, and the other short. They dispute with one another as to their superiority of learning.

The priest attend at births, marriages, and deaths: at a birth, several priests are called, who go through a ceremony of astrology predicting the fortune of the child, and receive presents.

Parties are married by a guru in the open air, when prayers are read; the tilak is then marked on their foreheads, they have "Khataks" (white silk scarfs) given to them by the guru, when they get to their house, and he departs with presents. At a funeral a Lamba attends whilst the body is burnt. The guru and other priests then attend, and presents are distributed. The ashes are thrown into a river, and the place where they were burnt, heaped over with cow dung and clay; and, if the friends of the deceased can afford it, a monument is erected in the shape of an urn. There are no nunneries or nuns in Spiti.

They believe in one God Supreme, but have a variety of inferior divinities, which are represented in their temples. Prayers and charity are, in their estimation, sufficient to ensure happiness in another world.

They believe in various births hereafter: that a man's span in this world is 70 years: but in the second it will be 60, the third 50, and so on till 10, when a man is only to be a háth (1½ ft.) in height. They believe in many yugs; they say that only three have arrived, and that nine hundred and ninety-seven are yet to come. Metempsychosis forms a part of their belief, but they are not explanatory on the subject, and say that only the Teshú Lambú can explain it. It is rather extraordinary with this belief that they should eat the flesh of animals, which they will not kill, but receive to be eaten when they have been killed, or have died. The store-house of the Gumpá has a large supply of dried dead animals, and pieces of flesh strung and dried.

Once a month, the whole of the priests assemble for general prayer, it is first read by the Gelong, and repeated by all the rest. Their most remarkable festivals are usually at the full moon.

This is all the information which I have thought it necessary at present to collect, regarding their religious institutions and customs. The Lambas are quiet and inoffensive, and much respected by the people generally.

If the country is highly taxed, it will be necessary to make some provision for the priesthood in the shape of Jághír.

Lahassa is called by the people here "Chotá Chín," and the country between Lahassa and Mánassarovar or "Mantaloi," is called "Guari." China Proper is called "Gynuk." The country of Little Thibet is called "Bálti," or that portion above Cashmere, &c. The Ladak country goes by its own name.

Climate.—Having no Barometer with me, I am unable to ascertain the atmospheric pressure, but with a Thermometer only graduated to Zero, I have, as regularly as I could, taken the temperature of the air since my arrival; always morning and evening, but being generally on the march at mid-day, I have not often been able to ascertain it at that time. I give in a table (No. 2) the range as observed, which will point out the winter climate as being very severe. The diminution of atmospheric pressure is inimical to the growth of trees, and there are only to be found a few stunted trees of "Juniperus excelsa" and willows.

The prevailing winds are from South to East, and at times very high, and the greater portion of the tops of the higher mountains have all the snow swept off by the wind. I remark particularly in Spiti, what struck me so much last July in Lahoul, and especially North of the Bará Lachá, that the soil gives out much heat by radiation. The want of heat and atmospheric pressure are, in these regions, greatly against vegetation.

Having given a succinct account of this country and its people, I may sum it up by saying, that Spiti is a mass of nearly bare rocks, with here and there small patches of cultivation, almost entirely without trees, thinly populated, and small villages, the largest not having above 25 houses. The table which I annex will give the number of houses of the villages.

I have now but to add a sketch map of the country, such as will afford a reference to villages. I do not profess to give the rivers in their proper form or distinct ramifications. I have taken their angles; but, without a protractor, cannot lay them down. Besides, that task has most likely been already done, and much better done than with my opportunities or resources, I could hope to perform it.

Conclusion.—I trust that any deficiencies in this report will be excused. I have no proper paper; my hands are so benumbed with cold, that I can with difficulty write, and the ink freezes in my pen at every two or three words. I have had no books or maps to guide me, and am in perfect ignorance of any thing that may have hitherto been written: all is from my own unguided observation. I should, upon the whole, say that the country is in a prosperous state, the people are well housed, well clothed, and possess an abundance of food, such as they are accustomed to: they are contented and happy, with principles of order and industry; and, with a moderate taxation, I think they will prove good subjects, and useful and beneficial to the Government to which they are now annexed.

Having thus stated facts, which I was alone ordered to collect, with a view to enable a future settlement to be made, however incomplete these may be, though collected to the best of my ability, I trust that my superiors will be able to form a judgment both of the country and its people.

(Signed) W. E. Hay,
Assistant Commissioner.

TABLE NO. 2.

Range of Thermometer in Spiti from the 9th December, 1849, to the 15th of January, 1850, exposed to the Sun.

Date.		*At 6 A. M.*	*Noon.*	*6 P. M.*	
December,	9th	14	48′	24′	
1849,	10th	14	not observed	23′	Snow.
	11th	17	,,	22′	
	12th	10	72′	18′	
	13th	6	74′	20′	
	14th	10	63′	16′	
	15th	6	,,	17′	
	16th	4	,,	14′	
	17th	12	,,	21′	
	18th	14 Cloudy	34′	18′	
	19th	13	,,	21′	Snow.
	20th	12	,,	19′	
	21st	11	58′	25′	
	22nd	13	68′	22′	
	23rd	14	,,	24′	
	24th	14	,,	20′	
	25th	6	32′	20′	
	26th	6	,,	14′	
	27th	4	,,	24′	
	28th	4	,,	12′	
	29th	at *Zero.*	,,	18′	
	30th	18	,,	22′	
	31st	12	,,	6′	Snow.
January,	1st	at *Zero.*	,,	6′	
1850.	2nd	12	,,	6′	Snow.
	3rd	14	30′	14′	Snow.
	4th	13	28′	18′	Snow.
	5th	10	29′	13′	Snow.
	6th	at *Zero.*	46′	12′	Fair.
	7th	8	56′	13′	Snow.
	8th	13	23′	11′	Snow.
	9th	6	24′	18′	Snow.
	10th	18	28′	16′	Snow.
	11th	15	27′	13′	Snow.
	12th	14	22′	7′	Snow.
	13th	at *Zero.*	53′	11′	Fair.
	14th	6	56′	10′	Fair.
	15th	4	20′	10′	Snow.
	16th	2	20′		

True Copy.

(Signed) D. F. McLeod,

Commissioner and Superintendent,

Trans Sutlej States.

True Copy.

P. Melville,

Secretary to the Board.

Examination of the New Mineral HAUGHTONITE (*a compound of Carbonate of Lead and Sulphate of Barytes*).—*By* HENRY PIDDINGTON, Esq. *Curator, Museum of Economic Geology.*

Amongst a few common rocks and minerals presented by Lieut. Haughton, Assist. to the G. G. Agent N. W. Frontier, on his departure for the Cape, I found a coarse, dirty-white, earthy looking mineral, which, judging only from its weight, might be taken for either an ore of lead or one of barytes, but on examination it proves to be a compound of both which I nowhere find described, and I thus deem it due to Lieut. Haughton to put upon record my examination of it, in hopes that we may in future obtain more and better specimens so as to enable us to pronounce more positively upon it than we can now do.

Our specimen is apparently the remains of an oblique rhomboidal table, much broken down by exposure to the atmosphere or to the action of water, and decomposing externally.

Its *external* colour, feel, soiling, and hardness when scraped, are exactly those of an impure earthy chalk; but in our specimen there are set numerous minute nodules (not exceeding a hemp seed in size) of a harder kind of the same mineral, and when a surface is scraped these shew a dull clayey shade, as if they were nodules of hard clay, though they are not so.

Its fracture, seen on a very small surface, is coarse hackly, and it is of some considerable toughness. It shews also in the fracture thin brown coloured veins, such as are sometimes seen in common earthy iron ores from vegetable matter.

It is externally very friable and soiling. It adheres a little to the tongue and feels heavy. The internal colour is that of a dull dirty fawn-coloured claystone, the lustre earthy, but perhaps in a strong light a little saccharine.

The smell is very remarkable, being oily and rancid, as if oil had been spilled upon it, and this especially when it is pulverised or heated high enough to drive off the water.

The powder is of a dull, yellowish-white colour. The external chalky surface then, is that of the decomposed mineral, which in some parts is 0. 2 or 0. 3 of an inch in depth. Its specific Gravity is but

3. 43; but it is apparently cellular, and if allowed to imbibe water for a few days might give a higher one.*

Blowpipe Examination.

In the forceps it blackens, softens and sometimes exfoliates a little, or a piece flies off. The most remarkable characters are the blackening and softening, by which last the points of the forceps are deeply impressed into the assay.

The blackened assay affords no trace of a sulphuret, and in the reducing flame the blackness soon goes off, leaving the whole mineral of a dirty greyish-white. It just fuses on the edges only, to a white enamel, like common heavy spar.

With Carbonate of Soda on charcoal, the usual brown sulphuretted bead of the sulphates, with their smell, &c. is immediately obtained.

With Borax a clear glass.

Via Humida.

Digested with Nitric Acid it effervesces slowly, and the filtered solution, when tested, gives the usual re-actions of lead, with a little iron; the lead perfectly well marked by Chromate and Hydriodate of Potash as also by sulphuretted Hydrogen. The greater part of the assay however remains upon the filter, and this, when fused with the Carbonates of Soda and Potash, gives Sulphuric Acid and Carbonate of Barytes.

By the only analysis for which I could afford an assay from so small and precious a specimen, I find it to contain

	per Cent.
Sulphate of Barytes,	83.52
Carbonate of Lead,	6.23
Oxide of Iron,	.75
Water, Organic matter† and loss,	9.50
	100.00

* Which I would not risk lest it should fall to pieces, which its earthy chalk-like texture renders probable.

*† As inferred from the blackening and smell, but this is by no means certain, as we have minerals in which blackening takes place from the mere separation of water or even without it; but the high per centage of the water, after the usual drying for mere Hygrometric water, would induce the belief that something more existed.

But these are only to be taken as approximative quantities, for the specimen, from its blackening which takes place in the crucible when the lead has been separated, evidently contains some peculiar matter, and the quantity of water which rises as it approaches the low red heat at which the blackening goes off is very remarkable.

As above mentioned, we cannot afford to sacrifice any more of this curious specimen for examination, and I should moreover remark that a portion of the external decomposed white crust was unavoidably taken in the analysis made. We have a right however to claim the discovery of it for Lieut. Haughton, and I have therefore named it, provisionally, HAUGHTONITE.

Note on an Inscription engraved upon a brick, found some years ago in a field near a village in the Jaunpur district by Captain M. Kittoe, with a transcript from the original by Hiránand Pandit, and a translation by James Ballantyne, Esq. L. L. D., Principal of the Benares College.—By Captain M. KITTOE.

Sanskrit.

सस्ति सम्वत् १२७३ आषाढ़ शुदि ६ रवौ। अद्येह मयूनगर्य्यां धनिकौ नाम्ना मतौ। राश्रीकह्नो राश्रीमहादित्यौ। राडोविसुतौ स्वधनं प्रयुञ्जाते। अतस्सकाशाद्धारणिको नाम्ना मतः। रागंगदेवो राधानुसुतः षड्दोद्रिकद्रम्मसहस्रद्वयसार्द्धशतद्वयं ग्रहात्युद्धारेणाङ्गेपि द्र २२५० अमीषां द्रम्माणां विश्वासार्थं च प्रवापिणीस्वकपट्टिकावन्धके प्रदत्ता॥ अस्मिन् पत्रे चोद्धारणिकहस्तेन स्वमत मारोपयति मतं मम। अत्राग्नौ रागकश्रीवाघदेवः॥ राजोपरोद्धेण रादेवादित्य राधोरि राकुमनपाल राविलास राप्रजयन् एते साक्षिणः कृताः पूताश्च लिखितं चेदमुभयानुमतेन ढिवाश्रीसोढलेन ढिवाहाटपुत्रेण दिग्धाक्षरमविवृताक्षरं वा ततोपि प्रमाणमिति॥

English Translation.

May it be auspicious! In the year (Samvat) 1273 (A. D. 1216), on Sunday, the 6th of the light half of Ashádh, this day, here, in the city of Mayu, the two bankers known by the names of Rá Sri Bahma and Rá Sri Mahádítya, the two sons of Rá Dovi, are turning their money to account (as follows). The borrower from them, known by

the name of Rá-Gangádéva, son of Rá Dhamí, takes as a loan two thousand two hundred and fifty Shadboddika (?) drummas—(in figures) 2,250; and as security for these drummas, he gives in pledge his cultivated and other lands. And on this deed (inscribed brick), by his own hand, the borrower places his assent thus—"This is my agreement." The surety, in this case, is Ranuck, Sri-Bághadeva, such a one as a king might be content with;—Rá-Devaditya, Rá-Dhauri, Rá-Kumanapála, Rá-Vilása, and Rá-Prajayan—these are made witnesses—worthy men. And this is written, with the consent of both parties, by Ḍhivá-Sri-Siḍhaal, son of Dhivá-Háṭa. If the letters get smudged or obliterated, still the matter can be certified by these (i. e. by the writer and the witnesses).

Note.

The above inscription, which may not be considered altogether as uninteresting, is engraved on a large brick 1 ft. 3 in. by 1 ft.; 3 in. in thickness. It is not an ordinary brick, but evidently made for the purpose; the writing has been done with a style when the clay was still damp, and has then been baked; but being of a soft clay and indifferently burnt, many of the letters have been much worn: yet, it is for the most part sufficiently clear to admit of its being easily made out. The character is that peculiar to Rájá Jayachandra's time, differing but slightly from modern Deva Nágri, with the vowel marks of *ai* and *ao* carried behind the preceding letter as in modern Bengali; for instance ऐ is written (ए, and औ is written (ओ. This peculiarity may be taken as a fair guide for fixing the approximate date of inscriptions in which dates are wanting; it appears to have fallen entirely into disuse in the latter part of Rájá Jayachandra's reign. But to return to our brick, I have heard that such are not of uncommon occurrence in this neighbourhood; but I have failed in obtaining any other specimen, and it was not without difficulty I procured this, as a superstitious veneration is attached to them simply because few can read and less understand them. They are generally supposed to be keys to hidden treasure.

The simple publication of the text and translation of an ancient inscription would at first appear to be of little moment—but the contents must be considered, and deductions drawn therefrom, which is the plan I have hitherto adopted. First then, we have a clear date, viz.

Samvat 1273 or A. D. 1216; the character is, as I have above mentioned, the nearest approach to modern Deva Nágri, the last shade of transition from the "*Gowr*" or "*Kútila*" of the inscriptions of the 9th and 10th centuries. No deity in particular is here invoked, by which we could speculate upon the creed of the praties concerned, or of the prevailing worship of the day—but the prefix is the mystic "*Aum.*" So that we may suppose them to have been Saivas, though it is not confined to them only. I should mention that inscriptions of this period have often the indefinite salutation of "praises be" and "praises be to whomsoever." From this it may be inferred that at that period, public opinion was divided as to which should prevail of several creeds. In Jayachandra's time the Buddhists were greatly persecuted, *ergo* they must have existed (probably in large numbers at so late a date, though the orthodox Hindus would deny this fact.)

We learn further from this inscription that the usage of mortgages prevailed as early as the 13th century, and that engraving the deeds, and probably burying the same in some spot on the land mortgaged, was common; the form is simple, and bears the stamp of honesty; it is drawn up, signed, and agreed to, before witnesses, and securities furnished for the fulfilment of the agreement. No registry is mentioned, though such a practice, at courts, prevailed as far back as the 4th and 5th centuries: two such documents engraved on copper are in my prossession. If the registry was made on bricks of the same bulk as that of the subject of our remarks, the Registrar would soon have had materials to build a house with.

We learn that the currency was termed "*drummas,*" in this instance "*Shadboddika drumma;*" but the meaning of the term cannot be made out by the pundits, who suggest that a "*drumma*" must be some given number of cowries, such as the "*gandás*" and "*chaddáms*" of modern times.

We are indebted to that talented scholar, Dr. J. Ballantyne, Principal of the Benares College, not only for the present translation, but for several others of lengthy inscriptions, from Gayá and other places, which I hope to lay before the Society at an early date; and I must here also acknowledge the services of pandit Hiránand, also of the College, who is the only one who has been successful in decyphering ancient characters.

K. M.

Answers to Mr. Piddington's Query about Winds, Storms &c. in Thibet, by A. Campbell. Esq. *M. D., Superintendent of Darjeeling.*

To the Secretary of the Asiatic Society, Calcutta.

Darjeeling, Oct. 1st, 1850.

Dear Sir,—In the third number of the Journal for 1850, there is a Memorandum, by Mr. Piddington, on the storms of wind experienced in Tartary, with a series of questions regarding them, to which he wished to have had replies from the late Thibet Mission.

The replies, if procured by the mission, have not been published. The mission however made its observations in Western Thibet only, having been foiled in its Eastern progress. It will therefore be the less necessary to apologize for intruding on the Society with a few imperfect replies to those questions, having reference to Eastern Thibet, the Southern out-skirt of which I visited last October, in company with my friend Dr. Hooker. The following replies are a running answer in regular sequence to as many of the 37 questions of Mr. Piddington as I have notes or other means of dealing with. The person alluded to as my informant, and who experienced a severe storm in Thibet, is a Bhotia friend of mine, who accompanied Dr. Hooker and myself on our journey, and is a very credible person. It was at Dochen, 32 miles from Phári*, that he encountered the gale, and the date of its commencement was the 7th of Mágh, Samvat, 1903. January 19th, A. D. 1847.

The portion of Thibet to which the replies refer, is composed of two extensive provinces and the trans-Himalayan tract of Dingcham; viz. "U" or "Oo," and "Chang," in some maps put down unitedly as U-Chang, in others as Utsang. "Oo" is the Eastern Province, with Lassa as its principal city. "Chang" the Northern and Western one, with Digarchi and Giangtchi as its principal towns. The mean elevation of these provinces is unknown. The cultivated portions may be 14,000 feet, for at 16,000 feet in Dingcham, wheat does not ripen. The district or tract named Dingcham lies along the Northern aspect of the Himálaya, extending from Tawang on the East, to the Meridian of Jumlá on the West, an extent of 360 miles or thereabouts. It comprises Phári, Dochen, the Ramchú Lakes from which the Painom river rises, Bumtso, Gerre, Kambajong, Dobtá, Sareh, and the Tingri

* For these places see Route to Lassa, J. A. S. for 1848.

Maidan. The mean elevation may be 16,000 feet. Bumtso which is an easy ascent, and does not by any means appear as a mountain in Dingcham, was reckoned by Dr. Hooker, by rough calculation of Barometrical observations to be 18,400 feet above the level of the sea. When we were at Bumtso on the 18th of October last, the Thermometer at 11 A. M. in the open air stood at 44°, the wet bulb at the same time being at 22° on the night before; in the vicinity of Cholámú 17,000 feet, the temperature fell to 5°. These particulars relating to the "elevation, cold, and dryness of the air" on which stress is laid by Mr. Piddington in connection with his questions, were given to me by Dr. Hooker on our journey, and are subject to his corrections when his meteorological observations are worked out.

Your's very truly,

A. CAMPBELL.

Answers to Mr. Piddington's Questions about Winds, Storms, &c. in Thibet, by A. CAMPBELL, *M. D. Superintendent of Darjeeling.*

The names by which the different kinds of wind are known in Thibet, are "Babink"—violent storms or whirlwinds; "Lhapa," a storm or whirlwind of less degree; "Lúmbú," ordinary wind. These are Thibetan names indicative of different degrees of intensity in the wind, and have reference to their character only—not to their effects, on objects. The "Babiuk" is generally preceded by a noise resembling the clatter of galloping horses which intermits: it comes on sometimes quite instantaneously, and lasts for all periods from an hour to three days. It has been known to last for seven days even. Storms occur but rarely between May and October, but frequently during the remainder of the year. The general direction of storms is from the West and South West, and so it is indeed of the ordinary wind also. The whirlwinds have not been observed to have any general direction onward, nor is it known which way they turn. They form suddenly on the open places, and mountain passes; the traveller sees the column of dust afar off; if on horseback he instantly dismounts, and crouches to the lee of his beast; if on foot he throws himself on his face on the ground, till it has passed over him. Dust, dry grass, pebbles, and even stones are taken up and carried in these whirlwinds, which are very frequent, and never accompanied by rain or snow. The god of the winds is named "Lúmlá" or "Lúnglá." The god of fire "Meh-lá." The god of

water "Chú-lá." The god of earth "Sahila-mú." There are no temples to, or images of, the spirit of the winds, but he is worshipped, and propitiatory offerings are made to him. All sicknesses are supposed to proceed from the gods of the four elements, or to be influenced by them, viz. earth, air or wind, fire, and water; and they are propitiated accordingly with reference to the ailment. The spirit of the winds is invoked in all affections of the breathing or chest; the god of fire in fevers and inflammations; the "Chúlá" in all affections of the fluids, such as dropsy, retention of urine, hemorrhages; and the god of earth in diseases of the solids, such as rheumatism, tumours, &c. In other diseases not distinctly referable to any one of these four deities, or to the elements over which they preside, the Lamas are first consulted, and as they may indicate, so is the deity to be worshipped.

Sacrifices are not performed in any part of Thibet, either to deities or demons. The propitiatory offerings are merely balls of flour, and water, and are cast away, when offered. Storms always begin in the West, and blow from the same quarter all through, changing only a little to the South or North. They are not supposed to be at all influenced in their occurrences by the time of the moon, as they occur at all periods of her increase and decline. It cannot be ascertained how often they occur in the year, as periodical gales like our equinoctial ones in India, seem not to be reckoned on; but once in 5, 7, or 9 years, there are many tremendous storms in Thibet, accompanied by heavy snow, when great loss of life is sustained. These storms are called "Kang-mo-chi." There was one in January, 1847, in the district of Dingcham.* They are accompanied by hail when they occur in the spring. Travellers and horses are suddenly overwhelmed in the snow storms from the enormous drift. This occurs principally at the passes of the Himálaya, and sometimes in crossing the Karúlá, and Kambolá ranges. They are generally preceded by peculiar appearances of the clouds which experienced travellers know at once, and no one else can distinguish. My informant experienced one of these storms and describes it as follows,† "I was fortunately in a house when it commenced; it lasted two days and two nights; it was most violent during the day, and moderated each night about 11 or 12 o'clock, going on again from daylight with increased intensity until noon when it was at its worst, and about two

* See preceding letter. † On the 19th January, 1847.

hours afternoon, on the second day it began to decline. It blew from the west and south-west." Tame animals are often killed in these storms. The wind destroys their eyes, and they lie down to die. The Kiang wild ass seems to resist their effects better than other wild animals, many of which are often found dead after they subside. There is no thunder or lightning either before, during, or after the greatest winter storms. In the lighter ones which occur in April and May, there is occasionally some thunder; but thunder is rare in Thibet. Storms are most violent in mountain passes; but in the open places they are very bad also. They are most violent in the district of Dingcham, less so in the Province of Chang, least so in "U" or "Oo"—indeed at Lassa, the capital of Province U, storms are very rare. No volcanoes are known in eastern Thibet, nor are there any other phenomena referred to, as accompanying the storms. The district of Kampá, a portion of which lies between the Provinces of "Chang" and "U," is next to Dingcham for storms, and the "Karoola" range which divides these two Provinces and is crossed on the road to Lassa, is the worst and most dangerous place for storms in all Thibet; but it is not so bad as the Dawkia, or Tunkala passes of the Himalaya, where the snow falls much faster and heavier than on any Thibetan mountains.

A. CAMPBELL.

Note by Mr. PIDDINGTON.

This note of Dr. Campbell's is of very great interest, affording us, as it does, a fair field for surmise that the inland storms of Thibet, and probably therefore those of Tartary and Siberia, may be, as conjectured, parts of revolving storms.

For if we take the Northern boundary of the Chang country (called Z'Zang in a French Atlas of 1840 before me) to be in about Lat 31° North, a revolving storm of which the centre was passing between 31° and 35°, or more North, would give Westerly gales to the whole district of Chang, and if these began at W. S. W. and veered to West and W. N. W. then the track would be from the Westward to the Eastward. If however we take the Bhotia's description to have literally and exactly given the veering of the wind "from the West and South West" then the course of that storm was *from* the E. N. E. to the W. S. W. Its great duration was owing to its slow motion or to its extent. The Bhotia's statement that the "Babink" or violent storm or whirlwind, "is generally preceded by a noise resembling the clatter of galloping horses which intermits," fantastic as it at first sight appears to us, is exactly in other words the Chinese fisherman's atmospheric warning noises as described by Dr. Morrison, and quoted by me.* "Slight noises heard at intervals a few days before, wheeling round and stopping quick, and also a thick muddy atmosphere," and with allowance for the difference between the open atmosphere of the sea and the mountain ranges of Thibet, the "distinct roar of the elements, as of winds rushing through a hollow vault" described by Mr. Gittens of Barbadoes, and quoted in Col. Reid's work, and probably also the "moaning noise" which has been several times very distinctly heard and noticed by good observers at Calcutta, in the Phillippines, at Baticolo and in the Southern Indian Ocean on the approach of a Cyclone.

* Sailor's Horn Book, p. 245, 2nd Ed.

Aborigines of the South. *By* B. H. Hodgson, *Esq., Darjiling.*

English.	*Malabar.*	*Singalese.*
Air,	Akayam,	Hulanga.
Ant,	Erumbu,	Kúmbeyá.
Arrow,	Ambu, Kanri, At-thiram, Pasam,	Sare; or Ĭyá.
Bird,	Kuruvi, Pullu,	Kurullá.
Blood,	Irat-tham, Uthiram, Kuruthi,	Lé.
Boat,	Thoni, Odam, Morak-kalam,	Arua.
Bone,	Elumbu, At-thi,	Ăta.
Buffaloe,	Erumei,	Miharaká.
Cat,	Púnei,	Balalá.
Cow,	Pasú, Au,	Eladena, [gawa, is the generic term.]
Crow,	Kákam, Kakkei,	Kaputá, kakká.
Day,	Naul, Thenam,	Dawasa; diná.
Dog,	Noy, Suvanam,	Ballá.
Ear,	Káthu, Sevi,	Kana.
Earth,	Púmi, Puvi, Prithivi, &c.	Pŏlawa.
Egg,	Muttei, &c.	Bijja.
Elephant,	Yanei, Kunjaram, Varanam,	Atá.
Eye,	Kan, Vilzi, Net-theram,	Aha.
Father,	Tahappen, Pitha, Thathei, Thanthei,	Piyá; appá.
Fire,	Neruppu, Thee, Kanali, &c.	Gini.
Fish,	Meen, Matcham,	Matsia.
Flower,	Poo, Putpam,	Mal.
Foot,	Kál, Pátham, Thál, Ade,	Paya.
Goat,	Adu, Velladu, &c.	Eluá.
Hair,	Mayir, Romam, &c.	Kes.
Hand,	Kai, Karam, At-tham,	Ata.
Head,	Thalei, Siram, &c.	Olua.
Hog,	Pandi, Súkaram,	Oorá.
Horn,	Kombu, Kódu,	Anga.
Horse,	Kutherei, Pari, Asuvam,	Aswaya.
House,	Vídu, Manei, Illam, Akam,	Geya.
Iron,	Irumbu,	Yakada.

English.	*Malabar.*	*Singalese.*
Leaf,	Ilei,	Kolé.
Light,	Velicham,	Eliya.
Man,	Manushen, Ádaven, &c.	Minihá.
Monkey,	Kurangku, Manthi,	Wandara.
Moon,	Melavu, Chananderan,	Sanda.
Mother,	Thai, Matha, Annei Annei,	Amma.
Mountain,	Malei, Vetpu, Meru,	Kanda.
Mouth,	Vái,	Kata.
Moschito,	Vísei, Melvísei,	Madurua.
Name,	Pér, Namam,	Nama.
Night,	Iravu, Irattiri, Al,	Rae.
Oil,	Ennei, Thylam,	Tel.
Plantain,	Válei,	Kesel.
River,	Yáru, Kangei,	Ganga.
Road,	Theru, Vithi, Valzi,	Párá.
Salt,	Uppu, Lavanam,	Lunu.
Skin,	Thól, Tholi,	Hama.
Sky,	Vánam,	Ahasa.
Snake,	Pámbu,	Sarpaya.
Star,	Natehetheram, Velli, &c.	Tarawa or tárakáwa.
Stone,	Kallu,	Gala.
Sun,	Veyil, Poluthu,	Súrya.
Tiger,	Puli, Vengei,	Wayággraya.
Tooth,	Pallu,	Datha.
Tree,	Maram,	Gaha.
Village,	Kurichi, Keramam,	Gama.
Water,	Thannír, Nír, Salam,	Watura.
Yam,	Kilangu,	Ala.
I,	Nán, Yán,	Mama.
Thou,	Ní, Nír,	Tó.
He, She, It,	Avan, Aval, Ah thu, or Athu,	Ohu, aé, éka.
We,	Nám, Nángal,	Api.
Ye,	Nïugal,	Topi.
They,	Averkal, Avei,	Owun.
Mine,	Ennudeyathu, Enathu.	Magé.
Thine,	Ummudïathu, Umathu,	Togé.

English.	*Malabar.*	*Siagalese.*
His,	Avanudeyathu, Avarudeyathu,	Ohugé.
Our's,	Engaludeyathu, Emathu,	Apé.
Your's,	Ungaludeyathu, Umathu,	Topé.
Their's	Oné,	Owngé.
One,	Ondu, &c.	Ekay.
Two,	Irandu,	Dekay.
Three,	Múndu,	Tunai.
Four,	Nálu,	Hatarai.
Five,	Inthu,	Pahai.
Six,	Aru,	Hayai.
Seven,	Elu,	Hatai.
Eight,	Ettu,	Stai.
Nine,	Onpathu,	Nawayai.
Ten,	Pat-thu,	Dahayai.
Twenty,	Irupathu,	Wissai.
Thirty,	Muppathu,	Tihai or Tis.
Forty,	Nátpathu,	Hatalehai.
Fifty,	Eympathu,	Panahai.
A hundred,	Núru,	Seya-yai.
Of,	In, Udeya, Thu,	Caret.
To,	Ku,	Tá.
From,	Ál, Irunthu,	Gen.
By, instr.	Kondu, Ál,	Wisin.
With, cum.	Udan, Odu, Idat-thu,	Samaga.
Without, sine.	Vittu, Allathu, Indi,	Natua.
In,	Il, Ul,	Atulé.
On,	Mél, Péril,	Pita.
Now,	Ippothu,	Dan.
Then,	Appothu,	Ewita.
When?	Eppothu,	Kawadá.
To-day,	Indu, Indeikku,	Ada.
To-morrow,	Nálei,	Heta.
Yesterday,	Néttu,	Eeyé.
Here,	Ingá,	Mehé.
There,	Ángéi,	Ehé.
Where?	Engei,	Kohéda.

English.	*Malabar.*	*Singalese.*
Above,	Méléi, Uyara,	Ihala.
Below,	Kéléi,	Pahala.
Between,	Udei, Idiyil,	Atare or mada.
Without, outside,	Veliyé, Purambér,	Pita or bahara.
Within,	Ulléi,	Atulé.
Far,	Thúra,	Dura.
Near,	Kitte,	Langa.
Little,	Siru, Konjam,	Tika.
Much,	Met-tha,	Bohoma.
How much?	Evvalovu,	Koccharada.
As,	Pól, Ena,	Caret.
So,	Appadié, Avoannam,	Mesé.
Thus,	Ippadi, Avoethamaka,	Mesí.
How?	Eppadi, Evoethamaka,	Kohomada.
Why?	En, Ethukkuka,	Ayi.
Yes,	Ám, Om,	Ou.
No,	Alla, Illei,	Nœ.
Do not,	Seyathéi,	Apá.
And also,	Um, Thanum,	Ta, da.
Or	Allathu,	Nohot.
His,	Avanudeya,	Ohirgey.
That,	Ah thu, Athu.	Eka.
Which, jón	Thu,	
Which, tón	Carent,	Kókoda.
Which, Kon	Ethu,	
What?	Enna, Entha,	Mokada.
Who?	Yár, Ever,	Kowda.
Anything,	Ethum,	Monawá numut.
Anybody,	Everayenum, Yarainum,	Kowru hari.
Eat,	Thin, Sappedu,	Kanawa.
Drink,	Kudi,	Bonawa.
Sleep,	Nel-thirei,	Nidá, gannawa.
Wake,	Villippu,	Nagitenawá.
Laugh,	Sirippu,	Hinahawenawa.
Weep,	Alukei,	Andanawa.

English.	*Malabar.*	*Singalese.*
Be silent,	Summayiru,	Katákaranda épá (i. e. do not speak).
*Speak,	Pésu,	Katákarapan.
Come,	Vá,	Waren.
Go,	Po,	Palayan.
Stand up,	Nil,	Hitapan.
Sit down,	Iru,	Indagan.
Move, walk,	Nadamáduthal, Nadei,	Awidapan.
Run,	Oduthal,	Duapan.
Give,	Thá-Kodu,	Diyan.
Take,	Edu,	Ganin.
Strike,	Adi, Thattu,	Gahapan.
Kill,	Kollu,	Marapan.
Bring,	Konduvá,	Geneng.
Take away,	Eduttupódu,	
Lift up, raise,	Uyarthu, Thúkku,	Ussápan.
Hear,	Kél,	Ahapan.
Understand,	Vilangu,	Terunganin.
Tell, relate,	Sollu,	Kiyápan.
Good,	Nalla,	Honda.
Bad,	Akátha.	Naraka.
Cold,	Kulirmei,	Sítala.
Hot,	Súdu,	Usna.
Raw,	Pachei,	Amu.
Sweet,	Inippu,	Mihiri.
Sour,	Pulippu,	Ambul.
Bitter,	Kasappu.	Titta.
Handsome,	Alahu, Alahána,	Laksana.
Ugly,	Avalatchana,	Kata.
Straight,	Nére,	Kelin.
Crooked,	Kónal,	Aeda.
Black,	Karuppu,	Kalu.
White,	Venmei,	Sudu.
Red,	Sivantha,	Ratu.
Green,	Pachei,	Nil.

* These Singhalese verbs are here put in the imperative mood.

English.	*Malabar.*	*Singalese.*
Long,	Nedia, Nínda,	Diga.
Short,	Kattei, Kurukal	
Tall man,	Uyarnthavan,	Usa.
Short man,	Kullan,	Miti.
Small,	Siria, Sinna,	Punchi.
Great,	Peria,	Mahat.
Round,	Vattippu,	Wata or guli.
Square,	Sathuramana,	Hataras.
Flat,	Shattei.	Patali.
Fat,	Kolut-tha, Thúlitha,	Tara.
Thin,	Melintha, Mellia,	Tuní.
Weariness,	Ileit-tha, Kalait-tha,	Wéhésa.
Thirst,	Thakam.	Pipása.
Hunger,	Pasi,	Badagini.

On the Shou or Tibetan Stag.—*By* B. H. Hodgson, Esq.

The subjoined sketch and measurements of a pair of stag's horns received from Tibet will doubtless excite much interest among Zoologists. I am indebted for the opportunity of examining these splendid spoils to my friend Dr. Campbell, Superintendent of Darjiling, who obtained them recently from a place called Ling-mo, not far from Phâri, and situated in that arrondisement of the Tibetan province of Tsáng which is denominated Ding-cham by the Tibetans.

Ding-cham is the district extending north of Sikim and of Western Bhútán, from the ghát line of the Himálaya to the Kambalá or chain bounding the valley of the Yárú (Sanpoo) on the south. This district is described as being extremely rugged and bare, and no doubt is so, to a great extent, as forming part of the counter slope or pente septentrionale of such a chain as the Himálaya, and as having an elevation (just beyond the ghâts, at least) of 16,000 feet, according to Dr. Hooker's determination. Yet Ding-cham is the habitat of a noble stag of the true Elaphoid type. Wherefore it is not too much to infer from this circumstance that within the bounds of that district, however



The Shou or Stag of Tibet. Cervus Affinis? mihi.

Cervus Tibetanus.

rugged, there must be large tracts of comparatively level land; and, as I have now obtained from various parts of Tibet two genuine Antelopes* with as many genuine Stags,† I conceive, that we may, nay should, generalize the above inference as to the physiognomy of the country, and conclude, that Tibet with all its inequalities of surface is justly denominated, upon the whole, a plateau by Humboldt, notwithstanding all recent surmises to the contrary.

With these few prefatory remarks, I now proceed to describe the horns of the Shou or Stag, par excellence, of Tibet. These horns, which are a pair and in excellent preservation, are evidently the spoils of a mature and fine sample of the species. They are pale in colour, moderately pearled or rough on the surface, well bent in the beam, widely divergent, very ample in size, and genuinely Elaphoid in type. They are fifty-seven and a half inches in length along the curve, and nine and three quarter inches in thickness above the burr; and they have the characteristic two basal and one central snags of the restricted group (Elaphus) very finely developed. The summit, however, consists of a deep fork merely, which is formed by one superior antler put off from the beam and not much inferior in size to it; and, as the very same character distinguished the splendid sample of the supposed Stag of the Morung which was described many years ago by me in the Journal, I incline to think that this simply furcate summit is normal, nor ever replaced in increasing age by a many-antlered crown. The two basal snags are separated by an interval of about two inches. They are inserted obliquely on the outer and anteal aspect of the beam, and their general direction is horizontally forwards and outwards; the lower one, however, having its point turned upwards, whilst the point of the upper one is curved downwards and backwards. The central snag is put off equidistantly from the basal and apical snags with an interval, from either, of about a foot. It starts wholly and clearly from the outside of the beam, and has an outward or lateral direction, at first horizontal, but curving boldly upwards from beyond the mid-length. It is smaller than the basal, or than the upper, snag, but ample in size. The upper snag is thick as the beam, but not so long; is also put off from the outer side of the beam, but has a wholly

* Pecticauda et Hodgsoni, or Góá and Chirú.

† Wallichii et Affinis, or Gyána and Shou.

upward direction not greatly divaricating from the line of the beam,* and, like it, inclined forward towards the tip. The beams are well bent with a handsome backward slope as far as the central snag, beyond which they rise rapidly, but still keeping their graceful curve. The burrs are distinct but not large, and the points are sharp, save that of the upper basal snag which is blunt and worn, owing apparently to constant attrition with the earth caused by this snag's downward direction, and which must, I should imagine, have incommoded the living animal when grazing. These splendid horns have a great similarity of size, character and form to those of my Cervus affinis, the only differences noticeable between the two, being that the snags of the present subject are all put off from the beam somewhat more laterally (outside), and that the brow antlers consequently do not incline so directly over the face of the animal. The marked backward and downward curve of the upper basal antler or snag of the Shou towards its tip may be noted as a further subordinate distinction; but, upon the whole I conceive that the Shou is identical in species with my Affinis, and I am thence led to conjecture that my sample of the latter, though brought immediately from the Morung or Eastern Tarai, yet had priorly been carried there by some Tibetan trader or traveller, from whom it was obtained by some official of the Durbar of Nepaul. Certain it is, at all events, that the species does not now inhabit the Tarai, nor has done in the memory of the oldest inhabitant; and also, that the Durbar after much enquiry, at my suggestion, could only ascertain positively that the sample presented to me came to it from the Morung where it was believed to have been killed. With the Morung the Tibetans have much intercourse, and therefore I am led to infer that my first specimen may have come originally from Tibet, because the species still abounds there, and is not, now at least, found in any part of the Tarai. It is a noble animal, far superior in size to the Stag of Europe, and equal to the Wapiti or American exemplar of the genus. The Persian Stag and the Stag of Cashmere, not to add that of Mantchúria, are very possibly identical with our species, which in that event might be appropriately called the Asiatic Stag. Meanwhile, and pending the determination of these yet undescribed animals,

* In "crowned" horns this divergency is always great, both in the complete and incomplete states.

my specific name Affinis can stand as equally applicable to the supposed Morungian, and to the known Tibetan, animal; or, the Shou can be denominated Tibetanus, if considered distinct from the Morungian species, of which there is a fine sample in the British Museum.

I have already given my reasons for holding that the Gyána of Tibet or Cervus Wallichii is distinct from Affinis; and, as those reasons equally apply to the Shou, the distinctness of the latter from Wallichii of the same region, is thus established.

Dimensions of the horns.

	feet	in.
Greatest divergency of the tips between the upper snags, ...	3	7
Divergency between the ends of beams, ...	2	5½
Greatest length, along the curve, ...	4	9½
Girth, just above the burr, ...	0	9¾
Chord of arc of beam, or greatest curve, ...	1	2½
Length of greater basal snag, ...	1	8¼
Length of lesser basal snag, ...	1	5
Length of mid snag, ...	1	4
Length of upper snag, ...	1	8
Interval of basal and mid snags along the beam, ...	0	11¼
Interval of mid and upper snag, ...	1	½
Weight of a single horn, ...	13 lbs.	

On the Ghassánite Kings.—By A. Sprenger, Esq., M. D.

Before the conquest of the followers of Mohammad there reigned a dynasty of kings in Arabia Petrea which is usually called the Ghassánite dynasty. They had come from Yaman and their tribe was related to the Khazrijites and Awsites, the tribes which occupied Madynah, to the Mázinites who are mentioned by Ptolemy and to some families of the Banú 'amr b. al-Azd, also to some of the Banú Aqçá and to the banú Hárithah b. 'amr b. 'ámir.* All authors agree that the Ghassánites derived their name from the spring Ghassán which according to Mas'údy is in the valley of the al-Ash'arians (the Elisari of Ptolemy)

* Khoshaybary.

between Zabyd and Rima' ﻉ : Pliny and Ptolemy place the Cassanitæ or Gasanitæ in the same spot. It would therefore appear that their original seats were in Yaman on the coast of the Red Sea. Arabic authors fable that the Ghassánites and the tribes related to them originally inhabited the city of Sabá which is mentioned by Mohammad in the Qorân probably on Jewish authority. There was a tank above the city, and a priestess foretold that rats or some other animals would perforate the dyke and that the city would be inundated. The inhabitants were so alarmed by this prediction that they emigrated. European critics have displayed an extraordinary amount of ingenuity in ascertaining what animal could have undermined the dyke! but none has for a moment doubted the truth of the fable.

The emigration of the Ghassánites from Yaman has probably taken place in the third century after Christ. This at least is the date of the immigration of the Khozá'ahites into Makkáh and of the Awsites and Khazrajites into Madynáh, and these three tribes migrated with the Ghassánites.

A generation in Arabia, as appears from the comparison of several hundred genealogies may be calculated at thirty lunar or twenty-nine solar years. The Ghassánite dynasty ceased 16 years after the Hijrah —A. D. 632. If therefore the Ghassánites had come to the throne of Arabia Petrea immediately after their migration, and if in all circumstances the eldest son had succeeded the father, we might suspect that there reigned from the time they emigrated from Yaman to the time when their dynasty ceased, that is to say, during a space of less than 400 years—about 13 kings; but it is certain that they did not at once conquer the country, and in oriental countries it seldom happens that the eldest son succeeds the father.

Hamzah of Ispahán, whom most other authors follow, gives us the following list of kings :—

1. 'Amr Mozayqiyá.
2. Jafnah.
3. His son 'Amr.
4. His son Tha'labah.
5. His son al-Hárith.
6. His son Jabalah.
7. His son al-Hárith called the son of Maria.

8. His son al-Mondzir the elder.
9. Al-No'mán son of N. 6.
10. Al-Mondzir son of N. 6.
11. Jabalah son of N. 6.
12. Ayham son of N. 6.
13. 'Amr son of N. 6. (Hamzah tells us that these six brothers have reigned together ninety-two years and eight months!)
14. Jafnah son of N. 7.
15. Al-No'mán son of N. 7.
16. Al-No'mán son of N. 12.
17. His son Jabalah.
18. Al-No'mán son of N. 11.
19. Al-Hárith son of N. 11.
20. His son al-No'mán.
21. His son al-Mondzir.
22. 'Amr son of N. 19.
23. Hojr son of N. 19.
24. His son al-Hárith.
25. His son Jabalah.
26. His son al-Hárith b. Aby Shimr.
27. His son Abú Karib al-No'mán Qatám.
28. Al-Ayham b. Jabalah, grandson of N. 25.
29. Al-Mondzir b. Jabalah, grandson of N. 25.
30. Sharáhyl b. Jabalah, grandson of N. 25.
31. 'Amr b. Jabalah, grandson of N. 29.
32. Jabalah b. al-Háríth b. Jabalah, great grandson of N. 25.
33. Jabalah b. al-Ayham, grandson of N. 10.

According to this list they would have reigned seventeen generations some of which (in cases, in which several brothers of the king succeeded him before his son) we should be obliged to calculate above the average duration: the dynasty could therefore not have lasted less than 520 years, and we would be obliged to place its beginning in the first century after Christ. Yet we know from Latin and Greek Historians that no such dynasty then reigned in Arabia Petrea.

Secondly, Hamzah himself allows that the last king was the grandson of the tenth, and this is confirmed by the Kitáb alaghány and all other

good authorities, therefore if the list of kings was correct he would have succeeded to the throne at least 300 years after his grandfather.

Thirdly, most good authors identify al-Hárith the son of Maria who was the seventh king and al-Hárith b. Aby Shimr who according to this list was the 26th king. This man is also called al-Hárith b. al-'Araj (the Lame). He was according to Hamzah's own statement engaged in a war with al-Mondzir b. Má al-Samá king of Hyrah about the A. D. 530. Moreover Maria was the sister of Hind al-Honud wife of Hojr Ákil al-Morar Kindy the grandfather of al-Hárith who was killed about A. D. 537.*

As all historians after Hamzah follow his authority we must in order to correct the above list consult earlier authors, viz. Mas'údy and Ibn Qotaybah:

The Ghassánites according to Mas'údy.

'Amr Mozayqiyá.

Jafnah.	al-Hárith,	Tha'labah.
1	*first king.*	1
Tha'labah.		al-Hárith son of Maria,
		2nd king.
1		
Al-Hárith.	Arqam.	
1	1	
Jabalah.	Maria.	
Al Hárith.		
1		
An-No'mán.	Abú Shimr al-Hárith, *4th king.*	
3rd king.		
	al-Hárith, *6th king* was on the throne when Mohammad was sent.	'Auf, *5th king.*

The Ghassánites according to Ibn Qotaybah.

'Amr (his origin is not known).

Abú Shimr al-Hárith I. first King.

1

Al-Hárith II. al-A'raj son of Maria takes Khaybar; is attacked by al-Mondzir b. Má as-Samá.

* In Freytag's *Proverbia Arab.* voce خذ and Qámús voce مارية

an-No'mán — al-Hárith III. 'Amr, Abú Shimr the younger.

Hojr, an-No'mán, 'Amr, Al-Mondzir. — al-Ayham.

Jabalah last king who had turned Mohammadan but apostatized under 'Omar.

Neither the list of Mas'udy nor that of Ibn Qotaybah is complete. The former author informs us that there were in all eleven kings and he enumerates only seven. The statement that there reigned in all eleven kings seems to be correct and if we put the three preceding lists together in such a manner as to make them agree with the incidental information which we find in other authors, we have eleven kings, viz.

'Amr

His origin is unknown according to Ibn Qotaybah p. 411. Mas'údy and Hamzah identify him erroneously with Mozayqiyá.

Zayd — al-Háríth I. 1st King — Jafnah

called *Moharriq*, and from him the whole dynasty is called âl Moharriq (Ibn Qotaybah and Mas'údy). Hamah places instead of him Jafnah and says he reigned 45 (lunar) years and 3 months.

(Mas'udy; Hamzah, Nos. 2 and 14) contemporary of Aswad King of Hyrah.

Zayd Manát — 'Amr I. 2nd King.

mentioned only by Hamzah (No. 3) reigned 5 years. Built the convents of Hály, Job and Hannád.

Hind — Tha'labah, 3rd King.

mother of Mondzir Ming of Hyrah who was born about A. D. 400.

(Mas'údy and Hamzah No. 4.) Built 'Iqyah and the fortress of Ghadyr in the Hawrán not far from the Balqá. Reigned 17 years.

Arqam — al-Hárith II. 4th King,

mentioned by Mas'údy who calls him erroneously Ibn Maria; and by Hamzah (Nos. 5 and 24) reigned twenty or twenty-six years. Was defeated by the Romans in 488. See Vincent, p. 248 note.

Maria — Abú Shimr, Jabalah I. 5th King,

d'zát qortayn wife of Jabalah.

mentioned by Mas'údy and Hamzah (Nos. 6 and 25.) Built Qanátir, Adraj and Qastal. (Castellum ?) Reigned 10 or 17 years.

al-Hárith III. 6th King.

called *al-A'raj*, *Ibn Aby Shimr* and *Ibn Maria*: the most distinguished King of the dynasty. Takes Khaybar; destroys the king of Hyrah al-Mondzir b. Má as-samá about A. D. 563. (Ibn Qotaybah p. 412, compare Freytag Prov. Ar. II p. 611). Hamzah mentions him under number 7 and 26. He reigned 21 years and 5 months. He is mentioned by Vincent in the Periplus, p. 248 note.

an-No'man	al-Mondzir	Jabalah	'Amr 9th King.	al-Háriṯh IV.
7th King. Mas'údy and Hamzah (Nos. 9 and 27) reigned 15 years and six months.	8th King. Mas'údy and Hamzah (Nos. 8, 10 and 30) reigned 13 years. He is called Mondzir the Elder.		(Hamzah Nos. 13 and 32) reigned 10 years and 2 months. Mas'údy calls him 'Auf.	10th King. A contemporary of No'man b. Mondzir of Hyrah. Hassán b. Thábit makes poems in his praise, (Mas'údy and Kítab al-Aghamy and Hamzah).

al-Ayham
1
Jabalah 11th and last King

was on the throne in A. H. 7 (Wáqidy and Ibn Ishaq).
Hassan b. Thábit made songs in his praise. Dethroned in A. D. 637.

Note on the bird-devouring habit of a species of Spider; by Capt. W. S. Sherwill. *Communicated by Mr.* Blyth.*

During one of my rambles in company with four other officers in the army, amongst the Karrakpur hills, in the immediate neighbourhood of Monghyr, on the Ganges, I fell in with several gigantic webs of a large black and red spider, which stretching across our path in many spots, offered from their great strength a sensible resistance when forcing our way through them. The webs are of a bright yellow colour, and we found them stretching from ten to twenty feet, that is, including the grey ropes which are generally fastened to some neighbouring tree or a clump of bambus, the reticulated portion being about five feet in diameter, in the centre of which the spider sits waiting for

* This interesting communication on the contested subject of bird-eating spiders originated in my request that the author would commit to paper the observation of which he had assured me in conversation.—E. B.

its prey; he is of a dark black hue with red about him, but at this distance of time, now three years, I cannot remember his exact appearance. I brought one down with me from the summit of the mountain Maruk, which is eleven hundred feet above the Ganges, and he measured six inches across the legs when set up. It was in the web of this very spider that I found the bird entangled, and the young spiders (about eight in number and entirely of a brick-red colour) feeding upon the carcass. The bird was much decomposed and enveloped in web, but the beak and feet being visible I sketched them, a copy of which sketch I enclose for your satisfaction.* The bird hung with his head downwards, his wings were closely pinioned to his sides by the entwined web, and was nearly in the centre of the web. The old spider which I secured was above the bird about a foot removed.

Had we not been a half-starved party, we should have bottled the bird, spider and young ones; but we were at the end of a five-days' roam amongst these steep hills, covered with wet grass, without beds or covering, in the height of the rainy season, so you may imagine our commissariat was at too low an ebb to afford brandy for such a purpose!

Note by Mr. Blyth. This communication from Capt. Sherwill is the more interesting, since the total demolition of Madam Merian's account of a bird-eating spider in Surinam, by Mr. W. S. McLeay, in the 'Proceedings of the Zoological Society,' 1834, p. The species would appear to be an *Epeira*, most probably undescribed, and remarkable for the "bright yellow colour" of its web.

Note on an Inscription from Oujein; by RÁJENDRALÁL MITTRA, *Librarian, Asiatic Society.*

Sometime ago Mr. R. N. C. Hamilton of Indore presented to the Asiatic Society a fac-simile of a Grant discovered in digging a ruin in the vicinity of Oujein. The character of the Inscription is the Kutila of the 10th century, engraved on two tablets of copper the last of which has on it a figure of Gaḍuḍa, the vehicle of Vishṇu. The style is extremely pompous and figurative, quite characteristic of the age in which it was written, and the document itself is imperfect as a

* A *Nectariniæ* apparently, and probably *N. asiatica*.—E. B.

legal record, giving neither the boundary of the donation, nor the name of the country over which the donor exercised his authority. The fact, however, of a Hindu monarch granting the revenues of a village in the vicinity of Oujein, for the use of a goddess in that city, in the year 1036 Samvat, seems to throw some light on the course of succession of the Chohan kings of Malwa.

The catalogue recorded by Abul Fazl, (*Ayín Akbary*, Vol. II. p. 51,) places the whole of the Chohan dynasty, extending to about 140 years, between Jag-deva and Maldeva, the latter of whom, it is said, was dethroned in the year 866, A. C., by Sheikh Sháh, father of Alá-uddín. It is, however, stated by the same authority that Alá-uddín was a minor in the year 1037, thus making the reign of the Sheikh last for nearly 172 years!

The grant under consideration records a list of four kings, the last of whom lived 57 years before Alá-uddín, and bestowed a village in the vicinity of Oujein; if this circumstance would authorize the belief that he was a ruler of that country, the four kings named in the grant would fill up the hiatus between Maldeva and Sheikh Shah, and divide among themselves the greater part of the 172 years which Abul Fazl gives to the Sheikh alone.

It is difficult to determine if Vákpati ráj, the last prince of the grant, was a scion of the noble house of the Chohans, or if Krishna-ráj Deva, the first on the list, was the immediate successor of Maldeva, and it is evident from the sanction of Rudráditya to the grant that Vákpati was not an independent sovereign, notwithstanding his ultra-regal title of *Mahárajádhirája*; the fact, however, of his authority in Oujein entitles him to a place in the blank between Maldeva and Sheikh Shah.

The names, arranged in the order of succession in connection with Abul Fazl's list, stand thus :—

Maldeva, 866, A. C. (A. F.'s list.)
Krishna-ráj Deva.
Vairisinha Deva.
Siyaka Deva.
Amoghaversa Deva, alias Vákpati-ráj Deva, alias Vallabhanarendra Deva, 980, A. C.
Sheikh Shah, (A. F.'s list.)

Dharma Rájá Saud, Vizier during the minority of Alá-ud-dín (1057), who put him to death.

Inscription.

याः कुन्दोदरभृद्विषानलमिलद्धूम्रप्रभाः प्रोल्लसन्मूर्द्धावद्धशशाङ्कको-टिघटिता याः सैंहिकेयोपमाः। याः कुक्षद्विरिजा कपोललुलिता कस्तू-रिकाविभ्रमास्ता श्रीकण्ठकठोरकण्ठरुचयः श्रेयांसि पुष्णान्तु वः॥ यल्ल-क्ष्मीवदनेन्दुना न सुखितं यन्नार्दितम् वारिधेर्वारा यन्न निजेन चात्मसरसा यत्नेन शान्तिं गतम्। यच्छेषा हि फणा सहस्रमधुरश्वासैर्न चाश्वासितं तद्रा-धाविरहातुरं मुररिपोर्वेल्लद्वपुः पातु वः॥ परमभट्टारक महाराजा-धिराज श्रीपरमेश्वर श्रीकृष्णराजदेवपादानुध्यात परमभट्टारक महा-राजाधिराज श्रीपरमेश्वर श्रीवैरिसिंहदेवपादानुध्यात परमभट्टारक महाराजाधिराज श्रीपरमेश्वरश्रीसीयकदेवपादानुध्यात परमभट्टारक महाराजाधिराज श्रीपरमेश्वर श्रीमदमोघवर्षदेवाऽपराभिधान श्री-मत्वाक्पतिराजदेव एथ्वीवल्लभ श्रीवल्लभनरेन्द्रदेवकुशली॥ तिथिस-मुद्रदादशकसंवद्धमहासायनिक श्रीमहाइकभुक्तसेम्बलपुरकग्रामे सम-मागतान् समस्तराजपु(रु)षान् ब्राह्मणोत्तरान् प्रतिवासिपट्टकिलजन-पदादींश्च बोधयत्यस्तु वः। संविदितं यथायामोयमस्माभिः षट्त्रिंश-साहस्रिकसंवत्सरेऽस्मिन् कार्त्तिकशुद्धपौर्णिमायां सोमग्रहणपर्व्वणि श्रीभगवत्पुरावासितैरस्माभिर्महासायनिक श्रीमहाइकपत्नी च्यासि-नी प्रार्थनया उपरिलिखितग्रामस्वसीमान्त्या गव्यूतिगोचरपर्य्यन्तः सहिरण्यावासभोगः सोपरिकरः सर्वादायसमेतः श्रीमदुज्जयिन्यां भट्टारिका श्रीमत्महेश्वरीदेव्यै स्नानालेपनपुष्पगन्धधूपदीपनैवेद्यप्रेक्ष-णकादिनिमित्ताय तथाखण्डस्फुटि(क)तटे च गृहे जगति समारच-नार्थञ्च मातापित्रोरात्मनः स्वपुण्ययशोऽभिवृद्धयेऽदृष्टफलनांङ्गीकृत्य-चन्द्रार्कार्णवक्षितिसमकालं परया भक्त्या शासनेनोदकपूर्वकं प्रतिपादितं च इति मत्वा तन्निवासिपट्टकिलजनपदैर्यथा दीयमानं भागभोगकरा

ङ्किरण्यादिकं सर्वमाज्ञाश्रवणविधेयैर्भूत्वा सर्वमस्याः समुपनेतव्यम्। सामान्यं चैतत् पुण्यफलं बुद्धा ऽस्यवासिनैरन्यैरपि भाविभोक्तृभिरस्मदारब्धधर्म्मदार्ढ्यायमनुमन्तव्यं पालनीयं च उक्तं च। बहुभिर्वसुधा भुक्ता राजभिः सगरादिभिः यस्य यस्य यदाभूमिस्तस्य तस्य तदा फलम्॥ यानीह दत्तानि पुरा नरेन्द्रैर्दानानि धर्म्मार्थयशस्कराणि। निर्माल्य वान्तप्रतिमानि तानि कोनाम साधुः पुनराददीत॥ अस्मत्कुलक्रममुदारमुदाहरद्भिरन्यैश्च दानमिदमभ्यनुमोदनीयम्। लक्ष्मीस्तडित्सलिलबुद्बुदवच्चलाया दानं फलं परयशः परिपालनञ्च॥ सर्वानेतान्भाविनः पार्थिवेन्द्रान्भूयोभूयो याचते रामभद्रः। सामान्योयं धर्म्मसेतुर्नृपाणां काले काले पालनीयो भवद्भिः॥ इतिकमलदलाम्बुबिन्दुलोलां श्रियमनुचिन्त्यमनुष्यजीवितञ्च। सकलमिदमुदाहृतञ्च बुद्धा नहि पुरुषैः परकीर्त्तयो विलोप्याः॥ इति संवत् १०३६ चैत्रवदि ६ पुण्य पुरावस्थितः श्रीमन्महाविजयंकरावारेस्वयमाज्ञादायकश्रीरुद्रादित्यः। स्वहस्तोयं श्रीवाक्पतिराजदेवस्य॥

Translation.

May the musk spots on the elegant little cheeks of Girijá, resplendent as the gem *kunda* (1) shining in a cloud of envenomed (2) smoke, beautiful as the strong neck of Srikaṇṭha, and comparable to Saiñhika (3) (grasping) the ten millions of moons that are bound round the well-formed head (of Durgá);—may they preserve you in prosperity!

May the trembling body of Murárí, whom the charming countenance of Lakshmí delighteth not, and the waters of the ocean softeneth not;

1. One of the inestimable treasures of Kuvera, the god of wealth.

2. Lit. "smoke generated by the burning of poison."

3. "Son of Siñhika, a demon with the tail of a dragon, whose head was severed from his body by Vishnu, but being immortal, the head and tail retained their separate existence, and being transferred to the stellar sphere, became the authors of eclipses, the first especially, by endeavouring at various times to swallow the sun and the moon."—*Wilson.*

whom not even the beauty of his own excellent and lotus-like form can pacify, nor the breath of the thousand-hooded Sesha (4) appease; —of him who is frantic at his separation from Rádhá:—may it protect you!

The most venerable king of kings, lord *Sri* Krishṇarája Deva was succeeded by the most venerable king of kings, lord *Sri* Vairisiñha Deva, whom succeeded the most venerable king of kings, lord *Sri* Siyaka Deva, who was followed by the most venerable king of kings, lord *Sri* Amoghavarsa Deva, alias Vákpati-rája Deva, beloved of the earth, Vallabhanarendra Deva, the healthy.

* * * Be it known unto all the brahmaṇas, regal officers, and lease-holding neighbours assembled in the village of Sembhalapura, which holds * * * Sri Maháyika, that in the year of Samvat 1036, on the occasion of a lunar eclipse in the month of Kártika, we (of the city) of Bhagavatpura have, by this *edict* and water (5), at the request of *Á*siní, the wife of * * * Sri Maháyika, for the promotion of the virtue and fame of ourselves and parents, presented to her this village, with an area of two coss beyond its boundary, together with all its buildings, commons, rents and taxes, for the period of the duration of the sun, moon, earth and ocean, (in order) to (defray the expenses of) bathing unguents, aromatics, flowers, incense, lights, edible articles, public exhibitions, &c. &c. (necessary for the worship) of the most venerable Haṭṭeswarí Dévi of Ujjayini, and for decorating her crystal-paved temple. It is therefore the duty of the lease-holders of this place to pay to her the usual revenue, taxes, gold, &c. in obedience to her desires.

This pious act, begun by me, involving as it does the good of the public, my descendants and successors ought to observe and uphold:—for it is said; "By many kings, Sagara as well as others, the earth has been governed. Whosesoever has been the land his has then been the fruit.

"The gifts which have been granted by former princes, conferring on

4. The king of the serpent race, as a large thousand-headed snake, at once the couch and canopy of Vishnu. *Wilson.*

5. i. e. the water made use of in the consecration of the grant.

them virtue, wealth and fame, resemble orts and vomited food. What good man will resume them ?" (6).

May they, who rehearse the munificence of my race, as well as those who do not, find this gift gratifying unto them ! and may they, knowing wealth to be as transient as lightning or like bubbles of water, uphold the bounty and fame of others !

Ráma the auspicious repeatedly beseecheth all the future rulers of the earth ever to preserve this public bridge of virtue for kings.

Wealth and life are as unstable as water on a lotus leaf, knowing this and the texts above quoted, men ought not to efface the glorious deeds of others.

The 9th day of the dark lunation of Chaitra, Samvat 1036.

* * * * By order of * * Sri Rudráditya. Done by Sri Vákpatirája Deva.

6. From Mr. J. C. C. Sutherland's version in the Journ. As. Soc. Vol. VIII, p. 486.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL

FOR JULY, 1850.

At a Meeting of the Society held on Wednesday, the 3d July, 1850,

The HON'BLE SIR JAMES COLVILE, President, in the Chair,

The Proceedings of the last Meeting were read and confirmed.

The Secretary intimated that Mr. G. Udny had expressed his desire to withdraw from the Society on the expiration of the current quarter.

Read letters—

From N. O. Baillie, Esq., submitting for sale, a portrait of Sir William Jones, (said to be) by Sir Joshua Reynolds.

Ordered that the Picture be returned to the owner as the Society cannot purchase it.

From Rev. J. Long, forwarding a letter from Rev. G. G. Cuthbert, Secretary, Church Mission Society, regarding Mr. Long's application for 10 copies of the Bibliotheca Indica, for certain Vernacular Libraries established by that Mission, in different parts of Bengal.

Ordered that Mr. Long's request be complied with.

From Bábu Peáry Chand Mittra, Librarian, Calcutta Public Library, acknowledging the receipt of Nos. 25 to 29 of the Bibliotheca Indica, and No. 1 of the Journal for 1850.

From W. Seton Karr, Esq., Under Secretary to the Government of Bengal, the subjoined letter regarding the repairs of the Adinah Masjid.

No. 913.

From the Under Secretary to the Government of Bengal.

To Dr. W. B. O'Shaughnessy, *Vice President and Secretary to the Asiatic Society.*

Dated Fort William, 11th June, 1850.

Sir,—In continuation of the letter from this office, No. 457, dated the 2d April, I am directed by the Deputy Governor of Bengal to inform you that His Honour has been pleased, as a preliminary measure recommended by the Military Board, to sanction an outlay of Rs. 500, for the purpose of clearing the jungle round the Adinah Masjid of Panduäh.

2. The Officiating Executive Officer of the 4th Division having represented that elaborately carved pieces of Sculpture are constantly being carried away from the Masjid in question, the Superintendent of Police has this day been requested to instruct the Joint-Magistrate of Maldah, to endeavour, by all lawful means within his power, to prevent the spoliation of this monument of antiquity.

I have the honor to be, Sir,
Your most Obedient Servant,
W. Seton Karr,
Under Secretary to the Government of Bengal.

From R. W. G. Frith, Esq., offering for sale a large collection of Insects from various parts of India.

Resolved—that the thanks of the Society be returned to Mr. Frith for his offer, and it be intimated to him that under the present state of their finances, the Society are unable to purchase the collection.

8. From Col. J. Low, Edinburgh, regarding the antiquities lately despatched by him from Penang.

Ordered that the Antiquities be returned to Col. Low's Agents in Calcutta.

9. From Dr. Roer, Secretary, Oriental Section, submitting certain Propositions of the Section, for adoption by the Society.

To Captain F. Hayes, *Secretary, Asiatic Society.*

Sir,—Dr. Ballentyne having offered a translation of the Sáhitya Darpaná for publication in the Bibliotheca Indica, I have the honor, by direction of the Oriental Section, to request the sanction of the Society to his proposal.

The Sáhitya is a well known Sanscrit work on rhetoric, giving a view of the various kinds of composition in Sanscrit, and would be of great interes to the student of Sanscrit literature.

The Section also recommend the reprinting of the text. It has been published before by the Committee of Public Instruction, but is now out of print, and a new edition will be acceptable, and meet with a ready sale, as it is a text-book in the Government Sanscrit Colleges.

I forward the undermentioned Sanscrit books, which the Section propose to be purchased for the Library.

I have the honour to be, Sir,
Your most obedient Servant,
E. Roer,
Co-Secretary, Asiatic Society, Oriental Department.

Howrah, 1st July, 1850.

5 copies of Kádambari, 2d pt. at 2 Rs., ...	10	0	0
1 copy of Dasa Kumára Charita, ...	2	0	0
1 ditto Váiyákaraṇa Bhúshana, ...	1	0	0
1 ditto Sánkhya Tattvakaumudí, ...	1	0	0
Co.'s Rs.....	14	0	0

To Captain F. Hayes, *Secretary, Asiatic Society.*

Sir,—By direction of the Oriental Section I have the honour to return the letters from Messrs. Lassen, Burnouf* and Müller, and to submit the suggestions of the Section thereon, for the approval of the Council and the Society.

2. With reference to Dr. Müller's letter the Section would propose,

1. That the Society should subscribe to 10 copies of each of the works intended to be printed by Dr. Goldstuecker, the cost to be charged to the Oriental Fund, as it has been done on a previous occasion concerning Dr. Weber's edition of the white Yajur Véda.

Those works are :

1. Jaimani's Púrva Mímánsá Sútra.
2. Mádhava's Nyáya Málá Vistára.
3. Kumárila's Tattva Várttika.

2. That Professor Brockhaus be presented with a copy of the Bibliotheca in return of his presentation of the Kathá-Sarit-Ságara to the Society.

* The letter from Professor Burnouf, I find, has not been returned to me.

3. With regard to Professor Lassen's complaint that the 14 numbers of the Bibliotheca and Dr. Hæberlin's Anthology have not reached him, the Librarian states, that he had despatched them last year along with other books per "Lord Auckland." The Section think it therefore advisable, that Messrs. Allen and Co. should be addressed on this subject, as well as on the cause of delay which appears to have taken place on several other occasions concerning the delivery of the books forwarded to them by the Society.

4. The Section recommend that those parts of the letters which refer to literary subjects be printed in the Proceedings.

I have the honour to be, Sir,
Your most obedient servant,
E. Roer,
Co-Secretary, Asiatic Society, Oriental Department.

Howrah, 1st July, 1850.

Extract from a letter of Professor Chr. Lassen, *dated the 3rd April,* 1850.

My dear Sir,—I received some days ago from Mr. Kœnig the 6th volume of Rájá Rádhákánt Deb's Sabda-Kalpa-Druma and Dr. Hæberlin's Sanscrit Anthology. Of the 14 numbers of the Bibliotheca Indica, the box contained only those, bearing the address of Mr. Kœnig, while those which the Asiatic Society had intended to favour me with, were wanting. I cannot doubt that these books were despatched from Calcutta, and must therefore believe, the neglect lies with Allen and Co., to whom I will write immediately; but I am much afraid, that I shall not get the books. This is most vexatious to me, as I feel greatly disappointed by being deprived of this collection, of which I cannot expect the Society to spare another copy for me. How slowly, in general, books from India reach us, you will perceive from the fact that I have only now received the February number for 1849, of the Journal of the Asiatic Society, and of Mr. Hodgson's latest writings I have as yet seen nothing. You will much oblige me by thanking the Asiatic Society in my name for Dr. Hæberlin's Anthology, and Rájá Rádhákánt Deb for the 6th volume of his Sabda-Kalpa-Druma.

I am very sorry to learn from your letter of the 8th January last, that neither the first part of the second volume of my Indian Antiquities, nor your diploma, together with the first numbers of the Journal of the German Oriental Society, has reached you. The former had last summer already arrived in London, as the Royal Asiatic Society acknowledged its receipt, and its non-arrival in Calcutta must likewise be ascribed to the neglect of the booksellers. I will in future despatch the books for Calcutta viâ Ham-

burg, and shall feel obliged, if you will do the same with the books, sent to me from Calcutta, under the address of J. Esmarch in Hamburg, who will safely forward them.

In the number of my Journal, now being under the press, I have given due praise to the publication of the Bibliotheca Indica by the Asiatic Society, and have also pointed out your share of merit in this undertaking. I am very glad to hear, that my proposition to publish the second part of the Naishadha has met with your approval.

I continue without intermission my work on Indian Antiquities. The printing of the next part will probably commence in the course of this year.

Extract from a letter of DR. M. MÜLLER, *dated Oxford, 20th March,* 1850.

MY DEAR SIR,—You will have probably received before this, I hope, the first volume of my edition of the Rig Veda. It was ready in October last, and I had given orders to despatch the copies destined for India. Meanwhile I went to Germany, and on returning to England after five months, I found that the copies for India were despatched only a short time ago. I hope, however, that they have now safely arrived there, and that my edition will meet with the approval of the learned in India. On my return I was delighted to find the books which you so kindly sent me, viz. the Bibliotheca Indica, to number 2d (February, 1849), the Indian prints, and the 6th volume of Rájá Rádhákánt Deb's Sabda-Kalpa-Druma. Pray tender my best thanks to the Society and to the Rája. I cordially thank you for your kindness, and congratulate you on your indefatigable efforts in publishing the Bibliotheca. The works you have selected are most excellent and useful. Should you be able to add also the Taittariya Saṅhitá, you would satisfy all our wishes; but whatsoever you may give us, it is welcome to us here in Europe. * * * * * * * *

The labours in Sanscrit go on vigorously in Germany. Of Lassen's Indian Antiquities the first part of the second volume has only as yet appeared; soon, however, the second part will be ready. Bopp is engaged in writing a Comparative Essay on Accent. You will have probably received the fifth part of his Comparative Grammar. Weber is rapidly proceeding with his Vájasaneyi Saṅhitá. His Journal 'Indian Researches' contains likewise a good deal of interesting material. Stenzler's edition and translation of Yajnaválkya is very useful and correct. Bemfey is printing a Sanscrit Anthology, and Hæter has published a kind of Sanscrit spelling book. Great and important works are expected of Dr. Goldstuecker, especially his edition of

Jaimani's Púrva Mímánsá Sutras with Sávara's commmentary, and Mádhava's Nyáya Málá Vistára perhaps also the Tantra Várttika of Kumárila. These works are of the highest importance for the history and further elucidation of the doctrines of the Vedas, and much information may especially be derived from them concerning ceremonies.

Kumárila abounds with interesting details of Indian antiquity and the reviving critical knowledge of Indian philosophy which has exhausted its ingenuity in the Vedas. The difficulty in his undertaking is, as usual, the expense, no bookseller being disposed without a subscription to enter upon so great an undertaking. And still all these works are of the greatest importance for our oriental researches. Do you think, the undertaking would meet with any support in India? The printing of Mádhavas Nyáya Málá Vistára, of which interesting extracts are given in his introduction to the Rig Veda, will be immediately commenced, and the continuation of his labours will depend upon the success of this work. If the Asiatic Society would patronize the undertaking in the same way as they have done Dr. Weber's, a great service would be done to all of us. I saw Burnouf in Paris. He is engaged in completing the second volume of his Buddhism. I am sorry to say, his health is not as good as one would wish for the interests of science. Very great expectations are entertained of his history of southern Buddhism. Nothing else is doing in Paris for the Sanscrit, with the exception of Langlois' translation of the Rig Veda, of which the second volume is out already. Professor Wilson's translation of the same work has far advanced in printing. Here, in England, all oriental interest is concentrated in the decyphering of the Babylonian and Assyrian inscriptions by Major Rawlinson. He is now publishing the results of his labours, and is a man upon whom one can place reliance. Bournouf had likewise made many researches on this subject, but has given them up on discovering, that the language is Semitic, which is not his especial line of study. Many of the geographical names which Rawlinson now reads, had been discovered by Burnouf already two years ago, without, however, his publishing them. In Berlin the work of Professor Lepzsius on Egypt, of which the first volume has appeared, creates great sensation. He is now occupied with a phonetic work which is to form the basis of a general system to represent by writing the sounds of Oriental languages, and the adoption of which would much advance Oriental science. We may come at last to an understanding on this subject, if each of us would agree to give up individual habits and customs. In India especially, I should think, the want of a systematic and general representation of Oriental words must be felt, and it would be a great thing, if after so many abortive attempts a general alphabet could be at last adopted. I will send you the work as soon

as it appears. Perhaps you may be able by your position, to contribute to its adoption by the Asiatic Society. This reminds me of Dr. Goldstueker's desire of becoming a member of the Asiatic Society, and of receiving regularly a copy of the Journal as well as of the Bibliotheca. The subscription might best be paid to Allen and Co. I have the same wish for myself, but am afraid, the expense may be too much for me. Pray, inform me of the amount of the subscription, and whether it is not less expensive to subscribe to the Journal only, which I am anxious to receive regularly. Are there still to be had in India complete copies of the Asiatic Journal? and what is the price? Here we can only procure single numbers, and at a very high price. Nor are the Asiatic Researches anywhere for sale, and if you should find an opportunity of obtaining a complete set, I trust, you will think of me. Professor Brockhaus in Leipzig has charged me with the following commissions for you. He does not think fit under the present circumstances to go on with the publication of the Kathá-Sarit-Ságara, and should feel delighted if you would complete this work in the Bibliotheca Indica. He is also very anxious to obtain a copy of the Bibliotheca. He has, some years ago, sent his edition of the abovementioned work to the Asiatic Society, but has never been informed of its arrival in Calcutta. With regard to the Rámáyana which you once intended to publish, Gorresio has completed his edition of the text, and the Italian translation, notwithstanding the Sardinian discomfiture, is to be continued. On an early occasion I will send you £20 from the Royal Library at Berlin. Dr. Pertz, the Librarian, avails himself, with the sincerest thanks, of the permission of the Asiatic Society to have MSS. copied, and has fixed that sum for the commencement. No further part of the Nirukta by Roth has appeared, but a commentary has been promised. The Sanscrit philosophical books which you so kindly got for me, are very interesting, and ought to be translated. Is nothing done in India for the Yóga philosophy? which until now has been so undeservedly neglected. How is it with the Brihad Devatá of Sonaka? Is no MS. of it to be had in India? In Berlin there is one full of interesting matter, but too incorrect for publication. Likewise Saunaka's Chaturadhyáya and the Pratisákhya to the Atharva are rare MSS. which I should like to possess, if they are obtainable.

Excuse my troubling you with so many wishes. I fear, my letter has become a heap of requests and questions. I shall, however, be well satisfied without your replying to all of them, only let me hear soon again of what you are doing in India for Sanscrit literature.

Ordered that the recommendations of the Oriental Section be adopted, and Dr. Roer be requested to make any suggestion he may think fit with reference to the Society's Agents in London.

10. From R. Watson, Esq., forwarding a slab of flexible Sandstone, presented by Capt. Douglas.

11. From M. l'Abbé J. M. T. Guerin, presenting to the Society a copy of his work on Indian Astronomy.

After some desultory conversation regarding the Society's Museum of Economic Geology, it was moved by Rev. J. Long, seconded by Mr. Mitchell and resolved—

That the Council be requested to procure from Mr. Piddington, as Curator of the Museum of Economic Geology, a report of what he has done in that Department during the last twelve months.

The Librarian and the Zoological Curator having submitted their reports, the meeting adjourned.

Confirmed 3rd, August, 1850.

J. W. COLVILE, *President.*
FLETCHER HAYES, *Secretary.*

Report of the Curator Museum of Economic Geology for July, 1849.*

Geology and Mineralogy,—We have received from Captain Ommanney, Executive Engineer, 3d Division, a box of specimens, with a paper describing the site at which they were found, which may be thought worth printing in the Journal. From the description given I am inclined to suppose these stones form part of the ruins of some attempt at a *barrage* of a river for the purpose of irrigation, and that the wells described by Captain Ommanney are those belonging to an ancient subterranean water course, the *kannaughts*† of the Persians, which are more or less known from Affghanistan and Persia to Constantinople, which city is still dependant upon them for much of its supplies of water.

Mr. Wm. Theobald, Junr. has sent us a miscellaneous collection of Indian and European rocks, minerals and fossils, out of which we shall be able to select a number of good ones, either as new varieties or duplicates, for our Cabinets.

* Having been mislaid, this Report was not published along with the proceedings for July, 1849.

† I do not know of any remains of them described in India, but it is difficult to suppose that the followers of the Mogul Emperors did not bring with them, and practice, the art of constructing these; and that, as here, the attempts often failed by the caprices of our Indian rivers.

Our old and zealous contributor Dr. Spilsbury sends us a large lump of the Magnetic Diorite described in my paper in the Journal for this year. He states also that the discoverer is Captain Jenkins, 10th Madras Infantry.

He mentions also a fine slab of Dendritic Sandstone but this is not yet received* though dispatched a year and a half ago!

He also presents a Hippopotamus' scull from the neighbourhood of Nursinghpoor, but minus the lower jaw; for which he is indebted, he says, to Mr. Cheyne, a Madras Medical Officer; and a portion of the lower jaw of an elephant of a kind totally unlike any of the preceding from the Nerbudda, and which he thinks resembles the E. *insignis* of Cautley and Falconer.

"It was dug up (he says) at Beltarree Ghat on the Nerbudda, a site from which I sent specimens years ago. Vide As. Jour. Aug. 1834, p. 389. These two specimens were sent in to Captain Elliot, the Deputy Commissioner of Nursinghpoor, and by him placed at my disposal."

Economic Geology.—I have put into the form of a paper for the Journal, my examination of an orange-coloured soil sent from Sikkim by Dr. Campbell, where it is used as a cure for Goitre.

Captain Campbell B. A., Commissary of Ordnance, Saugor, Bundlecund, has sent us a large collection of 128 specimens of rocks and ores, and of 44 specimens of clay of various kinds. These have not yet been examined.

Dr. Spilsbury has also procured for us from Dr. Macintire, Residency Surgeon, Nagpore, specimens of the various Samy stones (see Journal: Proceedings, Jan. 1845,) used in the polishing work of the arsenal there, as "Country Emery." The following is an extract from Dr. Macintire's chit sent by Dr. Spilsbury.

"By this day's banghy I send you a packet of small specimens of the different kinds of Samy stone procurable. I have numbered them 1, 2, 3, 3, 3, 4, 5, 6, so that you can select those you require. I can then send you any quantity. The first five specimens are found in a quarry at a village named "Pohorah" about 60 miles to the right of the Raepore and Calcutta road. It is a regular "Koorrun" quarry, and these stones are taken from it to different parts of the country as an article of trade by Brinjarras and other people. They are found in strata as I have numbered them, i. e. No. 1, is under the surface, No. 2, under that again, and then come the different kinds of No. 3, marked with the *. No. 3, is I believe found under all the others and there was too much water in the quarry to see what was under it. All these are

* It has since arrived.

used in the arsenal here as "Samy stone" by the native Sickleghurs, and in addition to them they use 4, 5, and 6, none of which were found at Pohorah. I dare say however they are to be had there if a careful search could be made. The Commissariat supplies the arsenal with all these kinds under the name of "Country Emery." It is purchased in the bazaars, where it is brought by the Brinjarras, Beparries, &c. &c. No. 6 is called by the Madras Sickleghurs the real "Samy stone," because it will scratch or cut tempered steel. Next to it, in their estimation, comes 3, all the rest are good enough of their kind and do well enough for cleaning brass work. Pohorah is situated in a hilly country. The only hill however known to contain these stones is the one in which the quarry is. Not far from it is a hill containing 'soap-stone' some of which the people brought to me."

So far Dr. Macintire's chit.—The stones however are of two different classes and have no relation to Major William's Samy stone which is an Agalmatolite, and rather used, it would seem, for burnishing. But in the eight specimens Dr. Macintire furnishes us with, are two new varieties for our cabinets, one of which is very remarkable; the specimens are as follows:

No. 1. Decomposing Fibrolite.

No. 2. Common white Corundum.

No. 3. Grey mottled Fibrolite.

No. 3. Mottled Corundum.

No. 3. Black Corundum!

Nos. 4 and 5. Common rose and lilac coloured Corundum.

No. 6. A very fine white Corundum.

The Black Corundum is a very remarkable variety, and though distinctly giving the re-action of the Corundums before the Blowpipe, i. e. the Sapphire blue glass with nitrate of cobalt, I have failed to detect iron or manganese in it. We must wait for a supply of it to know what the colouring principle is.

H. Piddington,
Curator, Museum Economic Geology.

Report of Curator, Zoological Department, for July Meeting, 1850.

Sir,—The donations which I have now to record consist of,

1. The skin of a young Assamese Goral, resembling that of an adult formerly received, and both differing from the ordinary Himálayan Goral in being of a bright rufous colour. Presented by Major Jenkins, of Gowhatti.

2. Thirty-five additional species of land and fresh water shells, from various parts of India, presented by myself.

I have the honour to be, Sir,

Obediently Your's,

E. BLYTH.

July 1st, 1850.

LIBRARY.

The following additions have been made to the Library since the June Meeting.

Presented.

Statistical Report of the district of Cawnpur; by Robert Montgomery, Esq. Calcutta 1849, 4to.—BY THE GOVERNMENT OF THE NORTH WESTERN PROVINCES.

A Dictionary, English and Panjábi, Outlines of Grammar, also Dialogues, English and Panjábi, with Grammar and Explanatory Notes, By Captain Starkey, 3rd Regiment, Sikh Local Infantry; Assisted by Bussowa Sing, Jemedar. Calcutta, 1849, 8vo.—BY THE GOVERNMENT OF INDIA.

Memoirs of the Royal Astronomical Society, Vol. XVIII. London 1850, 4to.—BY THE SOCIETY.

Monthly Notices of the Royal Astronomical Society, Vol. IX.—BY THE SOCIETY.

Astronomie Indienne l'apres la doctrine et les Libres Anciens et Modernes des Brammes sur l'Astronomie, l'Astrologie et la Chronologie suive de l'Examin de l'Astronomie des Anciens peuples de l'Orient et de l'explication des principaux monuments Astronomico-Astrologiques de l'Egypte et de la Perse, Par M. L'Abbe J. M. F. Guerin. Paris 1847. 8vo.—BY THE AUTHOR.

The Calcutta Christian Observer, for July, 1850.—BY THE EDITOR.

The Oriental Baptist. No. 43.—BY THE EDITOR.

The Upadeshaka. No. 43.—BY THE EDITOR.

Tattvabodhiní Patriká. No. 83.—BY THE TATTVABODHINI' SABHA'.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of May, 1850.—BY THE DEPUTY SURVEYOR GENERAL.

Journal of the Indian Archipelago for April, 1850.—BY THE EDITOR.

Two copies of the same.—BY THE GOVERNMENT OF BENGAL.

Oriental Christian Spectator for May, 1850.—BY THE EDITOR.

Satyárnava. No. 1.—BY THE REV. J. LONG.

Citizen. Nos. 1 and 3.—BY THE EDITOR.

Exchanged.

The Athenæum. Nos. 1173, and 1175 to 1177.

Purchased.

The Annals and Magazine of Natural History for April, 1850.
Kádambari, Vol. II. 5 copies.
Tattvakaumudi, 1 vol. 8vo.
Baiyákaraṇabhusana Sára, 1 vol. 8vo.
Dasakumára Charita, 1 vol. 8vo.

August 1850.

The usual monthly meeting was held on Wednesday, the 7th instant, at half-past 8 P. M.

The Hon'ble Sir James W. Colvile, President, in the Chair.

The proceedings of the July meeting having been read and confirmed, the Secretary stated that Lieut. Stubbs and Mr. H. R. Alexander had intimated their desire to withdraw from the Society.

The following Gentlemen were named for ballot at the next meeting:

Rev. W. Smith—proposed by Rev. J. Long, and seconded by Capt. Smith.

Lowis Stuart Jackson, Esq.—proposed by Mr. J. R. Colvin, and seconded by Henry Bogle, Esq.

Read letters—

From J. Cassella, Esq., Consul General of H. M. King of Sardinia, forwarding a copy of a work entitled *Rapport sur les Etudes Chemin de fer de Chambéry á Turin*, presented to the Society by Professor Christofaro Negri, President of the University of Turin.

From Capt. Kittoe, relative to a communication regarding his researches into the ruins of Sárnáth, in Benares.

It was proposed by Mr. J. R. Colvin, seconded by Mr. Jackson and resolved—

That the substance of Capt. Kittoe's letter be forwarded to the Secretary to Government, North-Western Provinces, with an expression of the Society's sense of the interest that attaches to any Research into the antiquities of Sárnáth, and of its hope that the Government of the North-Western Provinces will be pleased to give such assistance as may be in its power, to the prosecution of Capt. Kittoe's enquiries.

From F. L. Beaufort, Esq., forwarding some bricks with Arabic inscriptions, from an old building near Jessore.

From Joseph Power, Esq. Principal Librarian, University Library, Cambridge, communicating the thanks of the University for a copy of the Sanscrita Anthology and the first 14 Nos. of the Bibliotheca Indica, presented to it by the Society, and requesting to be supplied with the continuation of the last named work.

Communications were received—

From G. Buist, Esq., Bombay, on the Encrustations of Steam Boilers and Pipes in India.

Ordered for publication in the Journal.

From Major J. Hannyngton, Chota Nagpur, Tables of Mortality according to the experience of the Bengal Civil Service, with values of annuities, assurance, &c.

From Mr. Blyth, Remarks on the modes of variation of nearly affined Species or Races of Birds chiefly inhabitants of India. Ordered to be printed in the Journal.

From Dr. Roer, Secretary, Oriental Section, submitting a report of the Section respecting Dr. Wise's History of Tipperah. After some discussion, Mr. J. R. Colvin proposed—That the Secretary communicate with Dr. Wise to ascertain his authority for receiving the History transmitted by him, as a History which the Rájás of Tipperah themselves consider to be an authentic record of the origin of their family, and of the succession of Rulers of the Tipperah Ráj.

The motion having been seconded by Mr. Mitchell, was carried.

It was further proposed by Mr. Jackson, seconded by Dr. Roer, and resolved—that the Bengali Chronicle of the Rájás of Tipperah be made over to the Rev. J. Long, with a request that he will re-examine it, and submit to the Oriental Section such parts or notices of it as he may consider of such historical or other value as to be deserving of publication.

From the same, suggesting, in reply to a reference from the Society, that a copy of the Bibliotheca Indica be presented to each of the following institutions, namely,

University of London.
——————— Edinburgh.
——————— Utretcht.
——————— Leyden.
——————— Berlin.
——————— Bonn.
American Oriental Society.
Asiatic Society of Ceylon.
——————— of Hong Kong.

For all the above communications and donations, the thanks of the Society were voted, and the meeting adjourned.

Confirmed 4th September, 1850.

Signed { W. JACKSON, *Vice-President.*
F. HAYES, *Secretary.*

Report of the Curator, Zoological Department, for August Meeting, 1850.

To the Secretary of the Asiatic Society.

SIR,—I have only on this occasion to report the arrival of a large box of skins of mammalia and birds collected in the Kandian territories by Dr. Kelaart, of the Ceylon Medical Service. They are sent to me privately for comment, with permission to present certain specimens to the Society; and I propose to draw up a paper of descriptions of some of them for publication in the Society's Journal.

I have the honour to be, Sir,
Your's obediently,
E. BLYTH.

Asiatic Society's Room, Aug. 30, 1850.

LIBRARY.

The following additions have been made to the Library since the last meeting.

Presented.

Rapport sur les Etudes du Chemin de fer de Chambéry á Turin, et de la Machine proposée pour executes le Tunnel des Alpes entre Modane et Bardonnéche par M. le Chevalier Henri Maus: et Rapport redigé au nom de la Commission chargée de l'examen de ces études par M. le Chevalier Pierre Paleocapa, Turin 1850. fol.—PRESENTED BY M. CHRISTOFARO NEGRI.

Report of the Revenue Administration of the Lower Provinces, for 1847-8, (fol. Pamphlet).—BY THE GOVERNMENT OF BENGAL.

Futtehgur-Nameh, by Halay Rae, Deputy Collector. (Urdu.)—PRESENTED BY SIR HENRY ELLIOT, KT.

Report by the Secretary, on the Proceedings of the Bombay Geographical Society for 1849-50.—BY G. BUIST, ESQ.

A few Remarks on certain Draft Acts of the Government of India, commonly called the "Black Acts." By Ram Gopaul Ghose. Calcutta 1850, 8vo. pamphlet.—BY Bábu RA'JENDRALA'L MITTRA.

A Letter to J. C. Melvill, Esq., Secretary to the East India Company, on the Grand Exhibition of Art to be held in London, in 1851, as connected with the manufactures and raw produce of India. By J. Tailor, Esq. 1850, 8vo. pamphlet.—BY THE AUTHOR.

Journal of the Indian Archepelago, for May, June and July 1850.—By the Editor.

The Oriental Baptist, No. 44.—By the Editor.

The Calcutta Christian Observer, for Aug. 1850.—By the Editors.

Upadeshaka. No. 44.—By the Editor.

Tattvabodhini Patriká. No. 84.—By the Tattvabodhini' Sabha'.

Annual Report of the Tattvabodhini Sabhá, for the Bengali year 1771.—By the same.

The Oriental Christian Spectator, for June 1850.—By the Editor.

Meteorological Register kept at the Surveyor General's office, Calcutta, for the month of June 1850.—By the Deputy Surveyor General.

Purchased.

Comptes Rendus. Nos. 12 @ 20 of 1850.

Journal des Savants for January, February and March 1850.

Annals and Magazine of Natural History, for June 1850.

September 1850.

At a meeting of the Asiatic Society held on the 4th instant—

Welby Jackson, Esq. Vice-President, in the Chair.

The Proceedings of the preceding meeting were read and confirmed.

The following gentlemen, having been duly proposed and seconded at the last meeting, were balloted for and elected Members.

Rev. W. Smith.

L. S. Jackson, Esq.

Notes were recorded from Dr. Macrae and Rev. S. Slater, withdrawing from the Society.

Read a letter from W. Jackson, Esq. presenting a copy of a work on the Statistics of Agra, by C. C. Jackson, Esq.

The Secretary submitted an application from Mr. H. Roberts, Assistant to the Zoological Curator, soliciting an increase of Salary, also a note from the Council, stating that under the present state of the Society's Funds, they do not think themselves justified in recommending any increase of Salary to Mr. Roberts.

The Librarian and Zoological Curator having submitted their usual monthly reports, the meeting adjourned.

Confirmed, *2nd October*, 1850.

Welby Jackson, *Vice-President.*

Fletcher Hayes, *Secretary.*

Report of the Curator, Zoological Department, for August, 1850.

Sir,—My present Report records the presentation of the following donations.

1. Bábu Rájendra Mallika—A dead Lemur, the skin and skeleton of which have been prepared.

2. Rájá Pertáb Chand Singh—A recent specimen of a Shark.

3. Capt. Berdmore, Madras Artillery, Moulmein. A collection of skins chiefly procured at Mergui. Among them is that of a Squirrel which does not exactly tally with any previously examined. In the bird class, it adds a very beautiful Malayan Owl, *Syrnium seloputo*, (Horsfield,) to the Society's collection; and there are specimens of the young of *Sturnia sinensis*, a species stated by Mr. Lesson to inhabit the Malayan peninsula and Cochin China as well as China. Also specimens of *Argus giganteus* and *Euplocomus ignitus*, neither of which magnificent *Gallinaceæ* had previously been observed so far

to the north.* And Capt. Berdmore has sent examples of *Collocaliæ* (the edible-nest building Swiftlets) from the Mergui Archipelago, both skins and examples in spirit, with the nests and eggs, the former old and of inferior quality. The species resembles *C. brevirostris*, (McClelland,) but is larger than I had previously seen. I may further remark that I am indebted to Capt. Berdmore for some living specimens of the new Duck described in *J. A. S.* XVIII, p. 820, by the name *Sarcidiornis? leucopterus*; but it proves to be a typical species of *Casarca*.

I have the honour to be, Sir,

Your's obediently,

E. Blyth.

Library.

The following books have been received since the last meeting.

Presented.

The Report of the British Association for the advancement of Science, for 1849.—Presented by the Association.

Statistics of Agra; by C. C. Jackson, Esq.—Presented by W. Jackson, Esq.

The Calcutta Christian Observer, for September 1850.—By the Editors.

The Oriental Baptist, for September 1850.—By the Editor.

The Oriental Christian Spectator, for July 1850.—By the Editors.

Upadeshaka. No. 45.—By the Editor.

Journal of the Indian Archipelago, for May and June 1850, 2 copies.—By the Government of Bengal.

Meteorological Register kept at the Surveyor General's office, Calcutta, for the month of July, 1850.—By the Deputy Surveyor General.

The Tattvabodhiní Patriká. No. 85.—By the Tattvabodhini' Sabha'.

Rájabyabasthá, or a Bengali Translation of Mr. Beaufort's Digest of the Criminal Law of Bengal. By Hemachandra Mukarjya of Janái.—By the Translator.

Exchanged.

The Athenæum. No. 1120.

Purchased.

Bopp's Comparative Grammar, Vol. III.

Wallace's Memoirs of India.

Flügel's German Dictionary.

Edinburgh Review, No. 182.

Annals and Magazine of Natural History, No. 31.

Comptes Rendus, Nos. 21 @ 25, for June 1850.

Journal des Savants, for May and June.

* Hardwicke erroneously states that *A. giganteus* inhabits Sylhet. Vide MS. in British Museum.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of June, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.625	78.0	78.2	77.4	N.N.W.	Clear	29.656	90.9	88.7	81.6	N. N. E.	Cumuli	29.622	92.2	90.9	81.8	W.	Cumulo-strati
2S	.588	81.0	81.4	79.3	S. W.	Cirro-cumuli	.637	91.0	89.7	81.5	S. W.	Ditto	.593	95.6	94.0	82.5	S. W.	Ditto
3	.577	81.4	82.0	80.3	S. S. E.	Cirro-strati	.606	93.0	92.2	82.6	S. W.	Cirro-strati	.569	96.0	94.2	82.8	S. W.	Ditto
4	.531	78.2	78.7	76.3	W.	Ditto	.564	90.8	88.3	80.8	N. E.	Ditto	.505	94.2	92.7	80.3	N. W.	Cirro-strati
5	.487	83.3	83.9	81.7	E.	Cloudy	.513	88.1	87.6	83.1	E.	Cloudy	.482	89.8	88.7	82.9	E.	Cloudy
6	.513	79.3	79.7	77.8	E.	Ditto	.574	80.2	80.5	79.0	E.	Raining	.559	79.7	79.2	77.5	S.	Raining
7	.586	80.2	80.9	79.4	E.	Ditto	.609	90.2	88.8	82.4	E. S. E.	Cumulo-strati	.600	87.4	87.3	83.2	S. W.	Cumulo-strati
8	.582	80.3	81.0	79.8	E. S. E.	Ditto	.608	78.8	78.8	77.8	S. S. E.	Raining	.613	78.3	78.5	77.5	S. E.	Raining
9S	.564	81.0	81.8	80.8	E. S. E.	Raining	.608	80.0	80.8	79.5	S. S. W.	Ditto	.604	80.0	80.2	78.3	S. S. W.	Cloudy
10	.583	80.4	80.7	80.0	S. S. E.	Nimbi	.576	88.4	86.1	81.9	E.	Cumulo-strati	.550	89.7	88.8	82.5	E.	Nimbi
11	.500	80.3	80.7	78.5	E. S. E.	Scattered-clouds	.532	86.1	85.2	81.3	S. S. E.	Cloudy	.517	84.4	84.4	81.3	S. S. E.	Cloudy
12	.488	81.0	81.9	80.3	S.	Cloudy	.518	84.8	84.3	81.0	S. W.	Ditto	.480	87.3	86.6	82.0	S. W.	Ditto
13	.459	81.0	81.8	80.0	S. S. W.	Ditto	.487	87.8	87.0	81.0	W.	Ditto	.470	89.8	89.0	81.3	W.	Cumulo-strati
14	.440	82.3	83.0	80.7	S. W.	Ditto	.463	90.2	89.9	81.3	W.S. W.	Cirro-strati	.439	93.5	92.8	83.2	S. W.	Cirro-strati
15	.506	84.5	85.2	83.9	S.	Ditto	.550	90.2	90.0	82.0	S. W.	Ditto	.533	95.3	94.0	81.0	W.	Cirro-cumuli
16S	.558	84.2	84.3	82.8	S. E.	Cirro-strati	.585	93.7	92.2	85.2	S. W.	Cumulo-strati	.549	96.3	94.0	84.6	W.	Cumuli
17	.575	79.4	79.8	77.6	E.	Ditto	.600	92.0	89.2	81.0	E. S. E.	Cirro-cumuli	.589	94.4	92.8	82.3	E.	Cumulo-strati
18	.576	81.3	81.8	79.0	N. E.	Ditto	.595	88.1	86.4	80.2	E.	Cumulo-strati	.551	90.3	85.9	80.0	N. E.	Drizzly
19	.530	79.5	80.2	79.0	N. E.	Cloudy	.546	89.2	87.5	82.0	E. S. E.	Ditto	.508	90.2	89.4	82.4	E. N. E.	Cumulo-strati
20	.510	80.3	80.9	79.4	S. E.	Zenith-clear	.556	85.4	82.3	80.0	S.	Raining	.545	86.0	86.0	81.0	S. S. W.	Cloudy
21	.543	80.0	79.3	78.0	S.	Raining	.566	90.0	87.8	82.2	S. S. W.	Cumulo-strati	.541	90.6	88.8	82.4	S.	Nimbi
22	.511	79.4	79.9	78.3	S.	Rainy	.523	86.3	83.8	80.2	S.	Cloudy	.495	87.9	87.2	82.6	S.	Cloudy
23S	.473	80.0	80.7	79.5	S.	Ditto	.533	83.8	82.8	80.7	S. E.	Ditto	.489	84.0	82.5	80.2	S.	Ditto
24	..	..	..	..	....	.....	..	..	..	..	....	.....	.468	88.2	87.0	83.0	S. E.	Ditto
25	..	..	..	..	....	.....	..	..	..	..	....	.....	.477	91.3	90.6	83.6	W.N.W.	Cumulo-strati
26	.468	81.0	81.8	80.7	S. S. E.	Cirro-strati	.481	91.0	89.4	83.8	S.	Cumulo-strati	.477	88.2	87.3	83.0	S. S. E.	Cloudy
27	.427	80.0	80.9	79.0	S. W.	Ditto	.443	88.3	87.5	81.8	S.	Ditto	.417	91.0	88.9	82.5	S.	Cumulo-strati
28	.415	80.9	81.0	79.8	E.	Cloudy	.434	86.8	85.6	81.7	E.	Cloudy	.406	89.3	88.0	82.3	S. E.	Cloudy
29	.382	81.0	81.7	80.0	E.	Zenith-clear	.397	83.9	83.4	81.5	E.	Drizzly	.370	86.3	85.7	82.9	E. N. E.	Ditto
30S	.329	79.8	80.6	79.0	S.	Cloudy	.368	86.2	85.4	81.8	S. S. W.	Cloudy	.340	87.0	85.4	81.5	S. E.	Ditto
Mean	29.512	80.7	81.2	79.6	....	.....	29.540	87.7	86.5	81.4	....	.....	29.512	89.1	88.0	81.7	....	.....

[*Meteorological Register, continued.*]

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's Phase	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. 40. Upper.	Feet. 4. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.543	93.8	92.2	81.0	w.s.w.	Cumulo-strati	29.524	95.0	93.6	81.0	W.	Cumulo-strati	29.534	90.7	88.8	81.5	S.SW.	Cirro-strati	96.0	87.1	78.2	114.0	..	..		1
.542	94.0	91.5	83.0	S. W.	Cloudy	.532	90.4	88.3	80.4	SS.W.	Cloudy	.532	89.0	88.0	80.4	S. E.	Ditto	96.8	89.2	81.6	110.6	..	..		2
.521	96.1	93.4	82.0	SS.W.	Ditto	.528	93.2	90.8	82.2	E S.E.	Ditto	.522	87.6	87.0	80.0	S. E.	Cloudy	99.2	90.6	82.0	116.0	..	..		3
.455	94.0	92.6	82.0	SS.W.	Cirro-strati	.431	93.0	91.6	81.5	S.	Cirro-strati	.455	90.7	90.0	80.9	S.SW	Scatd. clouds	95.5	87.1	78.7	103.0	..	..	☾	4
.447	92.0	90.2	82.0	N. E.	Cloudy	.440	86.3	84.3	79.2	S.	Cloudy	.460	81.8	81.5	78.6	S.S.E.	Cloudy	92.0	88.0	84.0	100.3	..	2.54		5
.483	84.4	83.2	80.0	S. E	Ditto	.480	85.2	84.5	80.8	S. E.	Ditto	.515	83.8	83.3	79.7	S. E.	Ditto	85.3	82.2	79.0	..	..	0.10		6
.527	90.0	88.6	81.6	SS.W.	Ditto	.515	89.8	89.0	80.4	SS.W.	Ditto	.566	85.4	84.3	79.5	S.	Ditto	90.3	85.4	80.4	99.6	..	1.34		7
.546	79.5	79.8	88.5	S. E.	Rainy	.531	80.1	80.3	79.2	S. E.	Ditto	.546	81.2	81.4	79.3	S.S.E	Ditto	82.0	80.2	78.4	..	..	1.54		8
.541	81.6	81.8	79.8	S. E.	Cloudy	.499	83.0	83.0	80.0	S.S.E	Ditto	.518	84.2	84.4	80.7	S.S.E	Scatd. clouds	84.8	82.2	79.6	..	..	0.54		9
.485	86.2	86.0	82.1	N	Nimbi	.465	86.8	86.0	82.2	E N.E.	Ditto	.485	85.6	85.5	80.7	S.S.E.	Ditto	89.9	84.2	78.4	101.0	..	0.50	●	10
.459	88.3	88.1	81.7	S. E.	Cloudy	.427	89.0	87.3	82.0	S. E.	Ditto	.457	86.0	85.2	81.0	S. E.	Cloudy	89.7	85.2	80.6	102.8	..	0.24		
.457	86.2	86.0	81.4	S.S.E.	Ditto	.465	86.8	86.3	81.4	S. W.	Ditto	.459	84.8	85.2	81.0	S. W.	Ditto	88.4	84.7	80.9	..	..	0.06		
.418	91.4	90.7	82.7	W.	Cumulo-strati	.398	90.7	90.0	82.2	WSW	Cumulo-strati	.425	88.4	88.3	83.1	SS.W.	Cirro-strati	92.0	86.8	81.5	101.3	..	..		13
.407	96.2	95.0	84.3	S. W.	Cirro-strati	.400	96.2	95.3	85.0	W.	Cirro-strati	.399	91.0	90.3	84.0	S.	Cloudy	96.9	90.1	83.2	101.0	..	..		14
.490	98.0	96.2	82.8	W.	Ditto	.469	96.2	95.0	82.7	W.	Cloudy	.500	91.2	90.7	85.3	S.	Scatd. clouds	98.3	91.7	85.0	113.0	..	..		15
.543	83.4	82.0	77.0	S.	Cloudy	.573	82.1	82.1	78.0	E.	Ditto	.571	81.8	82.3	77.2	E.	Cloudy	97.9	91.3	84.7	110.0	..	..		16
.512	96.4	95.0	82.3	E.	Cumulo-strati	.485	95.7	93.8	81.0	E.	Cloudy to the S	.528	85.3	85.3	78.4	WSW	Cirro-strati	97.0	88.4	79.7	112.8	..	..		17
.485	86.0	84.8	80.7	NNE.	Cloudy	.468	84.8	82.9	80.9	S.	Raining	.495	82.8	83.0	80.7	S.	Cloudy	93.0	87.5	82.0	109.3	..	0.50	☽	18
.454	87.2	86.5	81.7	S. W.	Nimbi	.426	88.3	86.0	81.0	EN.E.	Cloudy	.469	83.3	83.2	80.2	EN.E.	Scatd. clouds	91.8	86.0	80.2	115.8	..	0.38		19
.490	90.3	89.7	80.8	S.	Cumuli	.473	88.8	86.4	80.8	S.	Cumulo-strati	.510	85.0	84.8	80.0	S.	Cirro-cumuli	91.0	86.0	81.0	103.0	..	0.56		20
.491	86.2	84.5	80.0	S.	Cloudy	.482	84.3	84.0	80.0	S.	Cloudy	.500	82.8	83.0	80.0	S.	Cirro-strati	92.0	85.7	79.4	106.0	..	0.46		21
.440	87.8	86.7	81.4	S. E.	Ditto	.426	89.1	88.2	83.0	S. E.	Ditto	.460	82.3	83.0	81.0	S.	Rainy	89.0	84.5	79.9	98.6	..	1.50		22
.455	81.6	81.1	79.1	S.	Ditto	.440	83.2	82.9	80.2	S. E.	Ditto	.466	83.2	83.4	81.0	S. E.	Cloudy	84.3	82.9	80.8	..	..	0.08		23
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	91.0	85.9	80.7	..	..	0.40	⊙	24
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	92.8	86.5	80.2	..	..	..		25
.417	91.0	89.6	83.3	S.	Cumulo-strati	.398	91.0	89.6	83.3	S.	Cumulo-strati	.422	86.7	86.3	80.8	SS.W.	Zenith-clear	91.9	86.9	81.9	106.0	..	..		26
.362	92.3	90.0	82.0	S. E.	Ditto	.345	93.8	91.4	82.8	S. E.	Ditto	.373	85.3	83.4	80.3	S. E.	Cloudy	93.2	86.8	80.4	109.8	..	0.12		27
.358	89.6	86.2	82.2	E.	Cloudy	.339	85.4	85.0	81.8	E.	Ditto	.378	86.3	85.9	81.8	N. E.	Ditto	90.8	86.1	81.3	108.3	..	0.17		28
.304	90.7	88.2	84.0	S. E.	Raining	.278	89.6	88.0	83.9	E.	Ditto	.307	84.8	84.2	80.3	E.S.E.	Zenith-clear	92.0	86.8	81.6	112.0	..	0.48		29
.273	90.0	88.1	82.6	S. E.	Cumulo-strati	.274	88.8	86.5	81.0	S. E.	Cloudy	.315	83.8	83.4	80.4	S.	Cloudy	91.2	85.6	80.0	112.3	..	0.48		30
29.461	89.4	88.1	81.9	....	.....	29.447	88.8	87.6	81.4	....	.....	29.470	85.5	85.2	80.6	....	.....	91.9	86.4	80.8	107.2	..	11.99		

JOURNAL

OF THE

ASIATIC SOCIETY.

No. VII.—1850.

*Conspectus of the Ornithology of India, Burma, and the Malayan Peninsula, inclusive of Sindh, Asám, Ceylon, and the Nicobar islands.**—*By* E. Blyth, *Esq.*

Fam. VULTURIDÆ.†

Gidh, H.: *Shukuni*, Beng.: *Gid*, or *Gerni* (Tickell).

Subfam. VULTURINÆ.

Genus Vultur, L. (as restricted).

72. V. monachus, L. (Edwards, pl. 290; Tem., *Pl. Col.* 426; Gould's *B. E.* pl. 2).

Syn. *V. cinereus* et *V. cristatus*, Gmelin.
V. arrianus, Lapeyr.
V. imperialis, Temminck.
V. vulgaris, Daudin.
V. niger, Brehm.
Ægypius niger, Savigny.

Hab. Mountainous parts of Europe and Asia; Himalaya.

* Continued from p. 342.

† The restricted Vulturidæ divide into

1. Vulturinæ. Comprising the genera *Vultur* and *Otogyps*.
2. Gypinæ. *Gyps* and *Gyphierax*.
3. Sarcorhamphinæ. *Sarcorhamphus*, *Cathartes*, and *Neophron*.

Genus Otogyps, G. R. Gray.

73. O. calvus (Tem., *Pl. Col.* 2).

Syn. *Vultur calvus*, Scopoli.

V. ponticerianus, Daudin.

Mollá Gidh ('Priest Vulture'), H.: *Lál-mátá Shukuni* ('Red-headed Vulture'), Beng.

Hab. India generally: common. Tenasserim provinces.

Subfam. GYPINÆ.

Genus Gyps, Savigny.

74. G. fulvus (Pl. Enl. 426).

Syn. *Vultur fulvus*, Gmelin.

V. persicus, Pallas.

V. vulgaris et *V. percnopterus*, Daudin.

V. albicollis, Linderen.

V. trincalos, Bechstein.

V. indicus apud Jerdon, *Catal.*

V. Kolbei (?), Daudin.

Gyps vulgaris, Savigny.

Mahá deo ('huge giant'), of Mahrattas?

Hab. Mountainous regions of the Old World: Himalaya; not well ascertained as an inhabitant of S. India.

Remark. Ornithologists are much divided in opinion as to whether at least two distinct, though closely affined, species exist in *G. fulvus* and *G. Kolbei* of authors. Dr. A. Smith regards them as the same, as does also Mr. G. R. Gray (in his second and improved edition of the Catalogue of *Raptores* in the British Museum (1848). Still more recently, M. Degland also identifies them, remarking that—"Le *Chasse-fiente* de Levaillant, et le *V. Kolbei* que M. Temminck lui rapporte, mais que le Docteur Rüppell regarde comme une espèce parfaitement distincte, me paraissent appartenir l'une et l' autre au *V. fulvus*;"—the various figures referred to by different authors, according to this naturalist, representing one and the same species in different phases of plumage. On the other hand, M. Alfred Malherbe, in his *Faune Ornithologique de la Sicilie*, p. 20, refers to *G. fulvus* and *G. Kolbei* as "espèces parfaitement distinct (ainsi que l'on peut s'en convaincre en examinant les nombreux sujets donnés au muséum

de Franckfort-sur-Mein, par M. le Docteur Rüppell);"* and M. Temminck gives their differences as follows, admitting both into the European fauna. The *Chasse-fiente (G. Kolbei)*, according to this naturalist, may be distinguished at all ages from the true *Vautour Griffon (G. fulvus)* by the shape of the feathers on the wings and under-parts, all of which are rounded at tip, whereas in the *Griffon* the same feathers are long and acuminated; the ruff also is not so long nor so abundant. General colour of the plumage of *G. Kolbei* pale *café-au-lait* or isabelline, often (or according to age) varied or margined with brown more or less deep. The adult is almost wholly of a whitish isabelline; whereas the plumage of the adult *Griffon* is light brown throughout. The crop of the *Chasse-fiente* is of a deep brown, the head and neck covered with close flat down. A fine adult in the Society's museum from Algeria (received from M. Malherbe) accords with this description of the *Chasse-fiente;* while a young bird from Nepal (in much worn plumage) seems to correspond with the *Griffon*. Dr. Schlegel classes the *Chasse-fiente* as a permanent variety of *G. fulvus*, terming it *Vultur fulvus occidentalis*.

Lastly, Mr. John Cassin, in his notes on the *Vulturidæ* in the collection of the Academy of Natural Sciences of Philadelphia (published in the 'Proceedings' of that Academy for 1849, p. 158), remarks finally on the question as to the plurality of species confounded under *G. fulvus*, that—"In the present case the number of specimens" (16!) "is not sufficiently large to warrant a conclusion, but they appear to present uniformly different characters enough to induce the opinion that the following are specifically distinct;—*Gyps fulvus*, (Gm.); *G. Kolbei* (Daud.); *G. indicus*, (Tem.); and *G. tenuirostris*, (Hodgson);" though he afterwards expresses a doubt with regard to the correct identification of the last, and believes the *G. indicus*, (Tem.), to be from Africa! Mr. Jerdon, however, considers that M. Temminck's plate of his *Vultur indicus* represents the young of *G. bengalensis*, (Gmelin).

75. G. INDICUS (Gray and Mitchell, *Ill. Gen. Birds*, pl. 3).

SYN. *Vultur indicus*, Scopoli and Latham.

* Dr. Rüppell himself, however, now considers them to be the same. Vide his *Systematische uebersicht der Vögel Nord-ost Africa's* &c. (1845), p. 9.

V. tenuiceps et *tenuirostris*, Hodgson.

HAB. India and Malay countries.

Remark. This is the only Vulture which we have seen from the Malayan peninsula, and it appears to be common in open country throughout India, never (that we have observed) coming into towns or populous neighbourhoods. Like *G. fulvus*, it has 14 tail-feathers, *G. bengalensis* having constantly but 12;* and it is remarkable for the elongation of the ceral portion of the bill, and narrow form of the head, as compared with *G. bengalensis;* the bill and head of *G. fulvus* being intermediate. Its plumage much resembles that of *G. fulvus;* but old birds have merely a few small scattered downy tufts on the black naked neck. The original description of this species by Sonnerat refers to an individual of the second year.

76. G. BENGALENSIS (Hardwicke's *Ill. Ind. Zool.*).

SYN. *Vultur bengalensis*, Gmelin (the young).

V. indicus, Tem. (young, apud Jerdon *in epistolâ*).

V. chagoun, Daudin } adult.
V. leuconotus, Gray }

HAB. India generally: Tenasserim provinces. A summer visitant in Afghanistan. Very abundant in populous neighbourhoods, about the outskirts of towns and villages, and occasionally even alighting in the streets, shewing little fear or distrust of the passers-by.† In the open country it is replaced by the preceding species. According to Rüppell, *G. bengalensis* also inhabits Sennaar.

Subfam. SARCORHAMPHINÆ.

Genus NEOPHRON, Savigny.

77. N. PERCNOPTERUS (*Pl. Enl.* 407, 429).

SYN. *Vultur percnopterus*, L. (nec Pallas).

V. leucocephalus et *V. fuscus*, Gmelin.

* From the Parrots and Birds of prey until we come to certain Pigeons, there is no other instance of the number of tail-feathers exceeding twelve.

† On one occasion, when a number of these Vultures had descended in the Society's compound at sight of some flesh, I observed a particularly fine adult, which I directed an attendant to entice by throwing to it morsels of meat nearer and nearer, when it was taken without difficulty by the hand. On seizing it by the wing, the Vulture struggled to escape, but made no attempt at defence. Its companions,

V. ginginianus et *V. albus*, Daudin.
V. meleagris, Pallas.
V. fuscus, Boddaërt.
V. leucocephalus, Brisson.
Percnopterus ægyptiacus, Stephens.
Sūngra, or *Sūndá*, ('sharp-scented,') Sindh (Burnes).

Hab. Warmer regions of Europe, Asia, and Africa: abundant on the plains of India; rare and accidental below the tideway of the rivers in Lower Bengal. A summer visitant in Afghanistan.

Fam. GYPÄETIDÆ.

Genus Gypaëtos, Storr.

78. G. hemachalanus, Hutton, *J. A. S.* III, 522.
G. barbatus orientalis (?), Schlegel and Pr. Bonap.
Ūrgūl, Masuri (Hutton): *Kajir*, or *Fumai*, Kabul (Burnes). *Golden Eagle* of English residents in the Himalaya.

Hab. Himalaya; Afghanistan.

Remark. There appear to be three closely affined species or races of Lammërgeyers, namely *G. barbatus* of the Alps and higher mountains of S. E. Europe and probably Asia Minor,—*G. meridionalis*, Brehm, of N. Africa and found also on the Pyrenees and in Sardinia,—and the present Asiatic race distinguished by a pectoral band, in general conspicuously developed, and which would appear never to occur in the others. *G. meridionalis* is recognized as a permanent variety of *G. barbatus* by Dr. Schlegel, equivalent to his distinction of *Circus Sykesii* from *Circus cinerascens;* but M. Degland regards it as insufficiently distinguished, it being merely of inferior dimensions and less robust.

however, immediately took the alarm, but without going away, and would not be enticed near enough to allow of a second capture. It is remarkable that during some years these Vultures come much more into the town of Calcutta than in other years; for, in general, they are little seen except about the abattoirs and place of cremation.

Tribe. NOCTURNÆ.*

Fam. STRIGIDÆ.†

Hulu, Jaghal, and *Būm* (Pers.), H.; *Hūtūm,* and *Pencha,* B.; *Bassá,* Cingh.

Subfam. BUBONINÆ.*

Genus BUBO, Sibbald.‡

79. B. ORIENTALIS *(Pl. Col.* 174, 229).

SYN. *Strix orientalis,* Horsfield.

S. sumatrana, Raffles.

S. strepitans, Temminck.

B. et *Huhua nipalensis,* Hodgson.

H. pectoralis, Jerdon.§

Huhua and *Huhu chil,* ('Howler'?, or 'Howling Kite'?,) Nepal (Hodgson): *Ūman,* Malabar (Jerdon).

HAB. S. E. Himalaya; S. India; and Malay countries.

80. B. BENGALENSIS (Gould's 'Century,' pl. 3).

SYN. *Otus bengalensis,* Franklin.

Bubo caveareus et *Urrua cavearea,* Hodgson.

Ghughu, H. (Jerdon).‖

HAB. India generally; Afghanistan: but not met with below the tideway of the rivers in Lower Bengal.

* Vide p. 317.

† The Owl family primarily divides into three subfamilies, viz.:—

1. BUBONINÆ. Comprising all the species with *aigrettes,* or the 'Horned Owls,' inclusive of *Nyctea* which has distinct though small aigrettes.

2. SURNINÆ. *Athene, Syrnium,* and their numerous (and chiefly intermediate) affines.

3. STRIGINÆ. *Phodilus, Strix* (as now limited), and *Glaux.*

‡ We have been assured of the existence of BUBO MAXIMUS, Sibbald, in the Himalaya, in addition to *B. bengalensis, Ketupa flavipes,* &c., but have seen no specimen. Mr. Gould has seen it from China.

§ *Bubo pectoralis,* (Jerdon), from the Himalaya, is given as a distinct species from *B. orientalis* (v. *nipalensis*) from Java, in Mr. John Cassin's Catalogue of the *Strigidæ* in the collection of the Academy of Natural Sciences of Philadelphia (1849).

‖ In Bengal, this name is applied to the Doves *(Turtur).* In either case, it derives evidently from the voice. So, also, *Hulu,* H., *Ulula,* latin (whence *Ululo),* and *Owl* (and *howl),* English, &c. Again, *Ūllū,* H., *Ūllūk,* Beng., for the *Hylobates hoolock.*

81. B. COROMANDER (Hardw. *Ill. Ind. Zool.*,—very bad).

SYN. *Strix coromandra*, Latham.

Urrua umbrata, Blyth.

HAB. India generally.

Genus ASIO, Brisson.

82. A. OTUS (*Pl. Enl.* 29; Gould's *B. E.* pl. 39).

SYN. *Strix otus*, L.

S. soloniensis, Gmelin.

S. deminuta, Pallas.

Otus albicollis, Daudin.

O. europæus, Stephens.

O. communis, Lesson.

O. vulgaris, Fleming.

O. sylvestris, arboreus, et *gracilis*, Brehm.

O. Wilsonianus, Lesson.
O. americanus, Bonap. } American.

HAB. Europe and N. Asia; Himalaya; N. Africa; N. America?

Remark. The N. American race, regarded as distinct by some authors, is considered by Mr. G. R. Gray to be identical with that of the Old World. Vide Brit. Mus. Catalogue of *Raptores* (1848).

83. O. BRACHYOTUS (*Pl. Enl.* 438; Gould's *B. E.* pl. 40).

SYN. *Strix brachyotus*, L.

S. ulula, ægolius, et *accipitrina*, Pallas.

S. arctica, Sparrman.

S. tripennis, Schrank.

S. palustris, Smies.

S. caspia, Shaw.

S. brachyura, Nilsson.

Otus palustris et *agrarius*, Brehm.

Chotá Ghughu ('small Owl'), H. (Jerdon).

HAB. Europe, Asia, Africa, and N. and S. America. India generally, visiting the plains in winter.

Genus SCOPS, Savigny.

84. Sc. ALDROVANDI, Ray (Gould's *B. E.* pl. 41; Jerdon's *Ill. Ind. Orn.* pl. 41, chesnut variety).

SYN. *Strix scops*, L.

S. zorca et *giu*, Scopoli.
S. pulchella, Pallas.
S. carniolica, Gmelin.
S. ephialtes, Savigny.
S. bakhamæna (?), Pennant.
Scops europæus, Lesson.
Sc. senegalensis, Swainson.
Sc. capensis, Smith.
Sc. sunia (chesnut variety), and *Sc. pennata* (grey variety), Hodgson.
Sc. malayanus, A. Hay.
Sc. rutilus, Pucheran, *Rev. Zool.* &c., 1849, p. 299.
Ephialtes spilocephalus (?), Blyth, the young?
Otus (Scops) japonicus, et *O. (Sc.) africanus*, Tem. (apud G. R. Gray).

Chitta gul ('small Owl'?), Telinga (Jerdon): *Chugad kusial*, or *Sunya kusial*, Nepal (Hodgson).

Hab. Europe, Asia, and Africa: in Europe migratory.

Remark. In India, Burma, &c., this species assumes a phase of plumage very commonly, which does not appear to have been ever observed in Europe, and in Africa but rarely;* though frequent also in *Sc. asio* of N. America, and a similar variation (though to a less extent) occurs likewise in *Syrnium aluco*, as well as in some of the *Podargi*. It is characteristic neither of age nor sex. The phase referred to is a bright chesnut-rufous colouring, more or less deep, with the markings sometimes nearly obsolete, except the black tips of the ruff and under-scapularies, and some streaks on the breast and flanks, the belly and lower tail-coverts continuing white with the usual markings. The aigrettes (so far as we have seen) are always rufous in Indian specimens; and there is generally a strong tinge of this hue upon the wings. We continue to doubt whether *Scops spilocephalus*, nobis (*J. A. S.* xv. 8), should not rather be considered a distinct species, even after examination of a second specimen; and an *Ephialtes gymno-*

* *Sc. rutilus*, Pucheran, is from Madagascar; and M. Alfred Malherbe mentions a specimen from Algeria "d'un roux vif rayé de noir et de cendré." *Catal. Rais. d'Ois. de l'Algerie*, p. 8. An Algerian specimen sent by that gentleman to the Society's museum has a considerable admixture of rufous in its colouring.

podus, G. R. Gray, *MS.*, from "India," is retained as distinct in Mr. Gray's second catalogue of the *Raptores* in the British Museum.

85. Sc. SUPERCILIARIS? (*Pl. Col.* 21 *?*).*

Syn. *Strix superciliaris (?)*, Vieillot (vide *Rev. Zool.* &c., 1849, p. 19).

S. rufescens, Horsfield.

S. Sonneratii (?), Temminck.

Ephialtes sagittata, Cassin.

Hab. Malayan peninsula and archipelago. (Not India.)

86. Sc. LEMPIJI (*Pl. Col.* 99).

Syn. *Strix lempiji*, Horsfield.

S. noctula, Reinwardt.

Scops javanicus, Lesson.

Sc. lettia, Hodgson.

Sc. lettioides et *griseus*, Jerdon.

Lempiji, Java (Horsfield); *Tharkavi Chugad*, or *Lattya Kudyal*, Nepal (Hodgson).

Hab. In different varieties, India, China (?), and the Malay countries.

Remark. Specimens of this bird from the sub-Himalayas, Asám, Sylhet, Arakan, and the Tenasserim provinces, are generally (but not always) larger than those from S. India and Ceylon, while examples from the Malay countries are, for the most part, deeply tinged with rufous-brown.

Genus KETUPA, Lesson.

87. K. FLAVIPES.

Syn. *Cultrunguis flavipes*, Hodgson.

Hab. Himalaya only (so far as hitherto observed).

88. K. CEYLONENSIS (Hardwicke's *Ill. Ind. Zool.*)

Syn. *Strix ceylonensis*, Latham.

S. Leschenaultii, Temminck.

S. Hardwickii, Gray.

S. dumeticola, Tickell.

Cultrunguis nigripes, Hodgson.

* Unfortunately, we have never seen the *Planches Coloriées* of M. Temminck; the only copy in Calcutta being, to us, inaccessible.

Ūlu (generic), H.; also *Amra ka Ghūgu*, H. (Jerdon): *Hutūm* (generic), Beng.; *Tee-dook*, Arakan (Phayre).

Hab. India generally; Ceylon; Asám; Arakan; Tenasserim provinces; very common in Lower Bengal.

89. K. JAVANENSIS, Lesson (Tem., *Pl. Col.* 74).

Syn. *Strix ketupu*, Horsfield.

S. ceylonensis apud Temminck.

Tamba, or *Ketombo Ratanapye*; *Hanta*, *Pelow*, Malayan: *Blo ketupu*, Java.

Hab. Malayan peninsula and archipelago: rare in Arakan.*

Subfam. SURNINÆ.

Genus ATHENE, Boie.

90.* ATH. CUCULOIDES (Gould's 'Century,' pl. 4).

Syn. *Noctua cuculoides*, Vigors.

N. auribarbis, Hodgson.

Dzee-gwet, Arakan (Phayre).

Hab. Himalaya; Asám; Arakan; Tenasserim provinces; China (Chusan).

91. ATH. RADIATA.

Syn. *Strix radiata*, Tickell.

Athene erythropterus, Gould.

Noctua perlineata, Hodgson.

N. cuculoides apud Jerdon, *Catal.*

Ath. undulatus apud Blyth, *J. A. S.* XI, 457.

Jungli Choghud, H. (Jerdon): *Chotá Kál-pancha* ('small Death-Owl'), Beng.; *Chugad*, Nepal (Hodgson).

Hab. Most parts of India; Sub-Himalayan regions: never on the alluvium of the Gangetic delta, but appears immediately this is quitted in a westerly direction.

92. ATH. MALABARICA, Blyth, *J. A. S.* XV, 280.

Syn. *Ath. castanoptera* apud Jerdon, *Supp.*

Hab. Malabar.

* Mr. Cassin gives "India" as the locality for a specimen of this bird: but we have never heard of its occurrence on the western side of the Bay of Bengal, and know but of one instance of its being obtained so high as in Arakan.

93. Ath. castanotus, Blyth, Museum Catalogue.

Syn. *Ath. castanoptera* apud Blyth, *J. A. S.* XV, 280.

Pancha Bassá ('small Owl'), Cingh.

Hab. Ceylon (where common).*

94. Ath. Brodiei.*

Syn. *Noctua Brodiei*, Burton.

N. tubiger et *Athene badia*, Hodgson.

Hab. Himalaya.

95. Ath. brama (*Pl. Col.* 68).

Syn. *Strix brama*, Temminck.

Noctua indica, Franklin.

N. tarayensis, Hodgson.

Káturiá Pencha, ('wood-Owl,' *i. e.* that hides in cavities of wood), Beng.; *Khukhusat*, Upper Hindustan; *Chugad*, or *Choghud*, H.; *Pungla*, Mahratta.

Hab. India generally to foot of Himalaya; Asám; Sylhet; extremely common in Lower Bengal: Persia (as about Erzeroum).†

Genus Ninox, Hodgson.

96. N. scutellatus (*Pl. Col.* 289).

Syn. *Strix scutellata*, Raffles.

S. hirsuta, Temminck.

S. lugubris, Tickell.

Ninox nipalensis, Hodgson.

Athene malayensis, Eyton.

Kál Pencha ('Death-Owl'), Bengal: *Choghud Besra* ('Hawk Owl'), H. (Jerdon): *Kheng-boop*, Arakan (Phayre): *Raja Wali*, Malayan.

Hab. India generally; Ceylon; Burmese and Malay countries:

* The Malayan *Ath. castanoptera*, (Horsfield, v. *spadicea*, Reinwardt), is mentioned as an inhabitant of the Tenasserim provinces by Dr. Helfer, and he is probably correct; but as Nos. 91, 92, and 93, are nearly affined to *Ath. castanoptera*, we must consider the Tenasserim species as needing satisfactory determination.

† Ath. psilodactyla, (L., apud Boie), v. *Strix noctua*, Retzius, *S. nudipes*, Nilsson, *S. passerina* apud Latham and Temminck, *Ath. bactrianus*, Blyth, *J. A. S.* XVI, 776, &c., inhabits middle Asia, as Afghanistan and Tibet, but does not appear to have been observed in the Himalaya. *Strix persica*, Vieillot, is probably a variety. Vide *Rev. Zool.* &c. 1849, p. 18.

not rare in Lower Bengal. Madagascar (Dr. A. Smith, *Afr. Zool.*, p. 163).

Genus SYRNIUM, Savigny.

97. S. INDRANI (Gray's *Ill. Gen. Birds*, pl. 14).

SYN. *Strix indranee*, Sykes.
Ulula? et *Bulaca newarensis*, Hodgson.
Bulaca monticola, Jerdon.
Newar, Nepal (Hodgson); *Loco Bassa* ('large Owl'), Cingh. (Layard).

HAB. Mountainous parts of India generally; Ceylon; Tenasserim provinces; Malayan peninsula.

Remark. We are strongly inclined to suspect that there exist two races of this bird, one of larger size peculiar to the Himalaya, the other alike in Central and S. India, Ceylon, and the Malayan peninsula.

98. S. SELOPUTO (Tem., *Pl. Col.* 230).

SYN. *Strix seloputo*, Horsfield.
S. pagodarum, Temminck.

HAB. Tenasserim provinces; Nicobar islands; Malayan peninsula and archipelago.

99. S. SINENSE? (Hardw., *Ill. Ind. Zool.*)

SYN. *Strix sinensis (?)*, Latham.
S. orientalis, Shaw.
Syrnium ocellatum, Lesson.

HAB. Most parts of India, to foot of Himalaya: not Lower Bengal (at least below the tideway of the rivers). China?

100. S. ALUCO? (Himalayan variety).

SYN. *Strix aluco (?)* et *S. stridula (?)*, Gmelin, &c. &c.
Syrnium nivicolum, Hodgson.

HAB. Himalaya: Europe; N. Africa; Asia Minor (Strickland); Japan (Temminck).

Remark. On comparison of numerous specimens both from Europe and different parts of the Himalaya, and varying much in plumage from both regions, we can no longer regard them as referable to more than one variable species, although Himalayan examples may generally be distinguished by their darker hue, and the usually greater development of the transverse markings of the plumage.

Subfam. STRIGINÆ.

Genus PHODILUS, Is. Geoffroy.

101. PH. BADIUS (Horsfield's *Zool. Res. in Java*, pl.).

SYN. *Strix badia*, Horsfield.

Wowo-wiwi, or *Kalong-wiwi*, Java.

HAB. Nepal; Sikim; Asám; Arakan; Tenasserim provinces; Malayan peninsula and archipelago.

Genus STRIX, L. (as restricted).

102. STR. JAVANICA, de Wormb (Gray's *Ill. Gen. Birds*, pl. 15).

SYN. *Str. flammea* of India and the Malay countries, auctorum.

HAB. S. E. Asia and its archipelago. Very common throughout India.

Remark. This species is distinguished from *Str. flammea*, L., by its larger size and especially by its more robust feet and toes.

Genus GLAUX, Blyth.

103. GL. CANDIDA (Jerdon's *Ill. Ind. Orn.* pl. 30).

SYN. *Strix longimembris*, Jerdon.

HAB. Plains of India; common: very rare on the mud-soil of Lower Bengal.

NOTE. Since the conspectus of Indian FALCONIDÆ was published, the author has received several standard works from Europe, among which are the valuable publications of Dr. Rüppell, the 'Manuel d'Ornithologie' of M. Temminck (ed. 1840), and the more recent Manual of European Ornithology of M. Degland. The following remarks occur on reference to these and other works.

FALCO LANARIUS, Schlegel, apud Degland, is by both of these authors identified with *F. Fieldeggii*, Schlegel, the African species which Mr. Strickland considers to be the same as *F. biarmicus* v. *peregrinoides*, &c. &c. (vide p. 319); and is not therefore the Indian F. JUGGUR (our No. 17), the adult and young of which have been figured by this name in Gould's 'Birds of Asia.' Dr. Rüppell, in his list of the *Falconidæ* of N. E. Africa (1845),* retains as separate species *F. peregrinoides*, Tem., and *F. biarmicus*, Tem., referring the latter to the subdivision *Tinnunculus*, while he assigns *F. chicquera* to *Falco*;†

* 'Systematische Uebersicht der Vögel Nord-ost Afrikas,' &c., p. 11.

† Dr. Rüppell unites *Hypotriorchis* and *Tinnunculus*, as indicated by his plac-

and it is remarkable that he does not include *Hypotriorchis subbuteo* in the list, though a migratory bird in Europe, and mentioned by Dr. A. Smith to occur at the Cape of Good Hope.

No. 19. There is a FALCO PUNICUS, Levaillant, "Exploration Scientifique de l'Algére, *Oiseaux*, pl. 1, 1847" (as cited by Mons. A. Malherbe), which may perhaps be *F. peregrinator*. Dr. Hartlaub is disposed to think it a local variety of *F. peregrinus*.*

No. 42. As it seems doubtful whether No. 41 is not the true ACCIPITER VIRGATUS, (Tem.), of the Malay countries, a note of doubt should be placed after this habitat as assigned to No. 42.

No. 61. As far as can be judged from Dr. Rüppell's figure of BUTEO RUFINUS, this certainly would not seem to represent the common Indian Buzzard; but we may suppose that Mr. G. R. Gray has good authority for the identification, although it does not appear from his last catalogue of the British Museum *Raptores*, that there is an African specimen of this bird in the national collection.

No. 71. We can find nothing in the descriptions of MILVUS ATER by M. Degland and others, which does not apply to the Indian *M. govinda*, and bear out Mr. Strickland's opinion of their identity. In *Proc. Zool. Soc.* for 1834 or 1835 (we are necessitated to quote from memory), a recent specimen of *M. ater* shot at Erzeroum or Trebizond is described to have had orange-brown (?) irides, whereas those of the Indian Kite are dark brown.

P. 317. The prior name BAZA, Hodgson, should be substituted for *Aviceda*, Swainson, among the *Perninæ*.

Summary View of the Indian RAPTORES, considered in relation to those of other regions. On glancing over the list of Indian raptorial birds, the faunist, familiar with European ornithology, cannot fail to be struck with the number of European species of DIURNÆ which likewise inhabit India:—all, in fact, with the exceptions of a few stragglers from Africa or America, the Jer Falcons of the north (and even one of these we have admitted, on what appears to be satisfactory

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ing *F. concolor*, Tem., in the latter.—Since writing the above, we have been fortunate in obtaining a live specimen of *F. chicquera*, observation of which inclines us now to regard it as an aberrant *Tinnunculus*,—certainly not a *Hypotriorchis*.

* "Bericht über die Leistungen in der Naturgeschichte der Vögel während des Jahres 1847," p. 14.

native testimony, as an exceedingly rare visitor in the N. W.), and finally *Haliaëtus albicilla*, *Milvus regalis*, *Archibuteo lagopus*, and *Tinnunculus æsalon*. The two last mentioned are known only as winter visitants in S. Britain, but all are more or less seen in N. Africa, and it is remarkable that *Archibuteo lagopus* is likewise met with at the Cape of Good Hope. We believe, too, that all of these are found throughout northern Asia. Certain European species, however, as *Pernis apivora*, are severally replaced in India by closely affined races (perhaps not in all instances distinguishable); and the same is perhaps the case with *Milvus niger*, and would have been averred of *Buteo vulgaris*, only that the latter would itself appear to inhabit a loftier elevation than the common Indian Buzzard on the Himalayas and likewise the Nilgiris. With the NOCTURNÆ, on the contrary, the species appear to be throughout distinct in the two regions, save only *Asio otus* and *A. brachyotus*, and *Scops Aldrovandi* and *Syrnium aluco*; though both of the latter are, in general at least, so far distinct in their plumage, that the Indian race of each may be regarded as a marked variety, or as one of the many instances in which it is not likely that zoologists will ever be agreed about considering as a distinct species or not. Again, of these four, *Asio otus* and the *Syrnium* are confined to the Himalaya, the *Scops* is widely diffused, and *A. brachyotus* is an erratic winter visitor in the plains, by no means rare in Lower Bengal. Of the non-European Indian species of DIURNÆ, a few belong to the high table-lands of central Asia, and are little known on the Indian side of the Himalayan snows: such are *Archibuteo hemiptilopus* and *Buteo aquilinus* and *B. plumipes*. *Falco sacer* appears to be a rare mid-Asian bird, scarcely perhaps more frequent in the Himalaya than in E. Europe. Other species inhabiting Europe and northern Asia which in India would appear to be peculiar to the Himalaya, are *Aquila chrysaëtos*, *Astur palumbarius*, and *Circus cyaneus*; also *Vultur monachus* and *Gyps fulvus*: and among the NOCTURNÆ (as before remarked) *Asio brachyotus* and *Syrnium aluco*, var.* It is remarkable that there is not a single raptorial species common to India and Australia; unless, indeed, the Indian Kite may yet prove to be identical with *Milvus affinis*, Gould, *Falco peregrinator* with *F. melanogenys*, Kaup,

* Perhaps also *Bubo maximus* and *Athene psilodactyla*. *Gypaëtos barbatus*, var., should perhaps be in like manner substituted for *G. himachalanus*.

and *Baza Reinwardtii* with *B. subcristata*, Gould: but many are common to India and the great Indonesian archipelago, and some to both of these regions and to Africa. Our list contains a few which are exclusively Malayan or Indonesian, *e. g. Baza Reinwardtii*, *Accipiter nisoides*, *Spizaëtus alboniger*, *Pontoaëtus humilis*, and *Scops superciliaris (? v. rufescens)*: other Malayan species reach only (so far as known) to the Tenasserim provinces, as *Hierax fringillarius*, *Buteo pygmæus (?)*, and *Syrnium seloputo*; or still further to Arakan, as *Ketupa javanensis*; or again further to the S. E. Himalaya, as *Phodilus badius*; or the Himalaya generally (visiting the plains of Bengal and Upper India in winter), as *Hypotriorchis severus*. Of species more or less common to all India (in suitable localities) and Indonesia, being moreover peculiar to these regions, may be enumerated *Falco peregrinator (?)*, *Pernis cristata*, *Astur trivirgatus*, *Accipiter virgatus (? besra)*, *Micronisus badius*,* *Spizaëtus cirratus*, var., *Ictinaëtus malaiensis*, *Poliornis teesa*,† *Pontoaëtus ictinaëtus*, *Haliaëtus Macei (?)*, *Haliastur indus*, and *Milvus govinda (?)*; also *Otogyps calvus (?)* and *Gyps indicus*: and among the NOCTURNÆ, *Bubo orientalis*, *Scops lempiji*, *Syrnium indrani*, and *Strix javanica*. Others, again, are common to those two regions and to Africa, as *Elanus melanopterus*, *Hæmatornis cheela (bacha ?)*, *Blagrus leucogaster*, *Gyps bengalensis*, and *Ninox scutellatus* (Madagascar); or to India and Africa exclusive of Indonesia (?), as *Tinnunculus chicquera*, *Aquila nævioides*, and *Buteo rufinus (?)*; to which may be added (though European rarities), *Circaëtus gallicus*, *Circus Swainsonii*, and *Hieraëtus pennatus*.

The species of raptorial birds peculiar to India are remarkably numerous, especially among the NOCTURNÆ; those, at least, which at present are only known to inhabit India. Some are very local, as *Athene castanotus* in Ceylon, *Ath. malabaricus* on the Malabar coast, *Ath. Brodiei* and *Ketupa flavipes* in the Himalaya; and of the three remaining species of *Athene*, *Ath. radiata* is also peculiar but more generally diffused, *Ath. brama* extends into Persia, and *Ath. cuculoides* is the only one we have seen from the eastern side of the Bay of Bengal, though in India it is confined to the Himalaya, and it spreads eastward

* Found also in Afghanistan.

† Or this should rather be considered a true Indian species, which extends its range into the Malayan peninsula and probably not much beyond.

so far as Chusan, and southward to the Tenasserim provinces.* Other fine Owls peculiar to India (or nearly so), are *Bubo bengalensis* and *B. coromander*, *Ketupa ceylonensis*, and *Syrnium sinense*, pretty generally diffused, and the *Ketupa* only appearing (so far as we have seen) on the eastern side of the Bay of Bengal; *Glaux candida* is found chiefly in Central India and parts of Upper Bengal. Not one of these species appears to be known in the Malay countries, and we are aware of only *Bubo bengalensis* having been met with in Afghanistan. Of *Syrnium indrani* we have seen three examples from Malacca, whence may be inferred that this Indian species is there not rare, and probably also inhabits some of the islands. Of DIURNÆ, the Himalayan Lammërgeyer, if not distinct, is certainly a well marked variety, found also in Afghanistan. Among the *Falconidæ*, so far as we at present know, the following species are peculiar to India. *Falco juggur*, *Baza lophotes*, *Spizaëtus Kieneri*, *Aquila hastata*; the long-crested race of *Spizaëtus cirratus*; *Accipiter virgatus (? besra)*; *Circus melanoleucos*, which inhabits all India and Ceylon, with Arakan and the Tenasserim provinces; *Hierax eutolmos*, from Nepal and Asám to Tenasserim; *H. melanoleucos*, Asám; *Spizaëtus nipalensis*, Himalaya and mountains of Ceylon, and perhaps identical with a Japanese species, as suggested by Mr. G. R. Gray. The genus *Hierax* occurs only in the N. E. extremity of India; and the various large fishing Eagles, excepting the Osprey, and perhaps *Blagrus leucogaster*, appear to be little known in S. India.

Several of the non-European *Falconidæ* of India are distinguished by an occipital crest, either rudimental or developed to a considerable length, and which is commonly held erect or nearly so; it is also generally accompanied by a peculiar style of marking of the plumage, exemplified especially by the three gular lines from which *Astur trivirgatus* takes its name.† These crested *Falconidæ* are *Pernis cristata*, *Baza lophotes* and *B. Reinwardtii*, *Astur trivirgatus*, the different *Spizaëti*, and *Hieraëtus pennatus* rudimentally; some of which birds, as the first three and the rest respectively, exhibit little mutual affinity in other particulars.

(To be continued.)

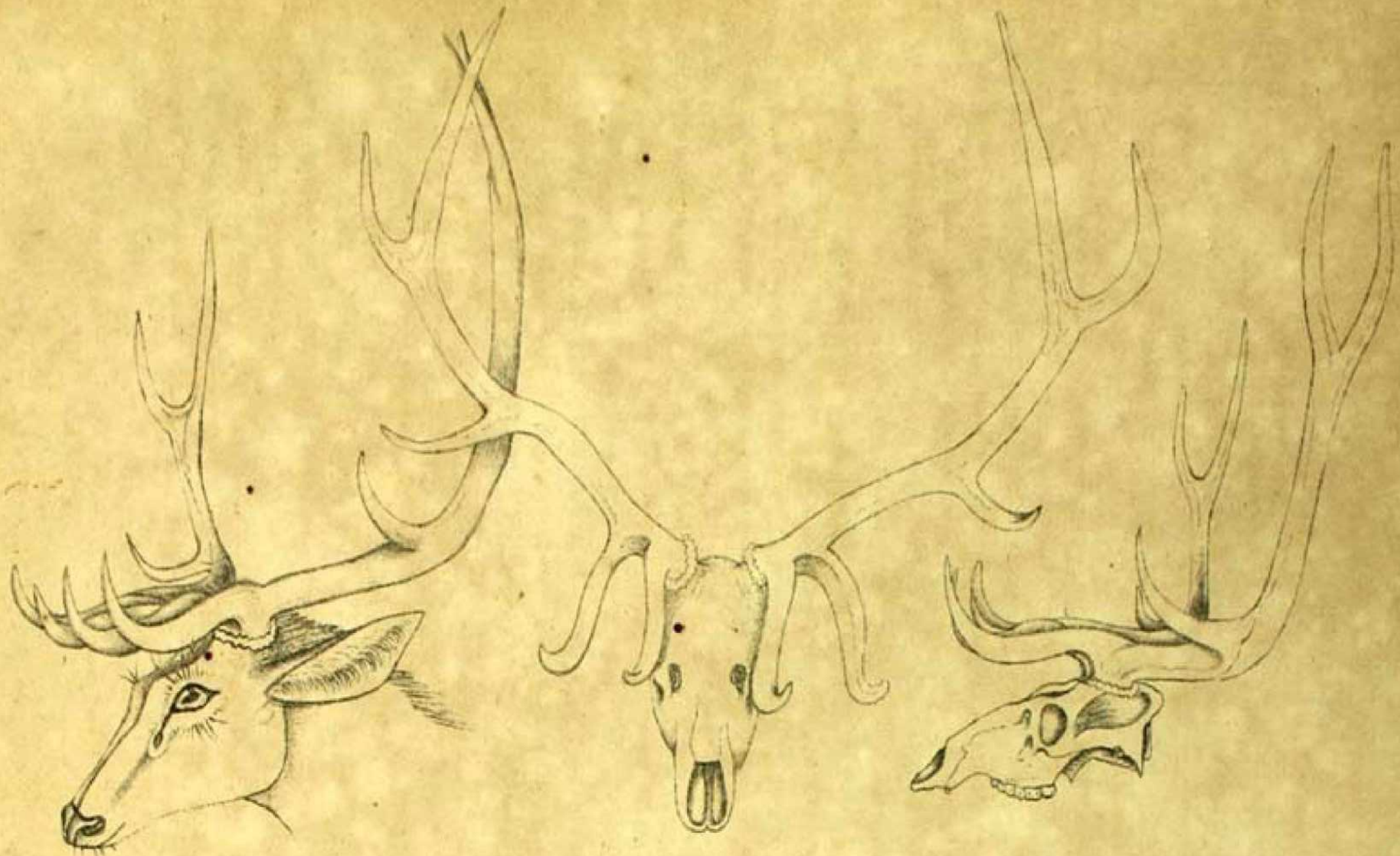
* The Tenasserim *Ath. castanoptera* apud Helfer is in need of further determination.

† *Accipiter virgatus (? besra)* and *nisoides* exhibit the same gular lines unaccompanied by an occipital crest.

Additional Notice of the Shou or Tibetan Stag.—*By* B. H. Hodgson, *Esq.*

Since my recent account of the Tibetan Stag was submitted to the Society I have been enabled, through Dr. Campbell's kindness, to examine another specimen consisting of a nearly complete head and horns with the skin on, and inclusive of the scull, which however wants the lower jaw. These are the spoils of a male, and a mature or rather aged male, as is evidenced by the inferior size of the horns, by the partially obliterated sutures of the scull, and by the well-worn canine teeth; and, as this magnificent animal is a tenant of one of the strangest and most interesting regions of the earth, I need make no apology for devoting a few more lines to the description of this second, and in some respects superior, sample of it. The skin is not entirely separated from the scull, nor am I permitted wholly to remove it; but the specimen, as it stands before me, affords satisfactory means of testing the characters, and obtaining most of the dimensions, of both head and scull, and I shall accordingly give a summary notice of both, in completion of my prior paper on the Shou.

The head with its integuments is about 18 inches long, of straight measurement from the snout to the occipital jut, and about 7 inches wide between the salient angles of the brows which project more to the sides than do the cheek bones and consequently exhibit the maximum of breadth. The bridge of the nose inclines to a curve or "Roman" shape. The forehead is broad and flat, seeming to have even a slight dip or depression before the bases of the horns. The mufle, or nude extremity of the nose, is small but distinct, smaller than in any congener I ever saw, but yet unmistakeably developed. It occupies the space between the nostrils, and descends narrowing on the front of the upper lip, till at the margin or aperture of the mouth, the nude moist part of the lip is reduced to less than three quarters of an inch in breadth. The larmiers or suborbital fissures are of medial size, and nude inside as well as round their edges. They are much smaller than in the Rusas, but fully as large as in the Red Deer. The ears are remarkably long (9½ inches), narrow and pointed, and their copious lining of soft hair, not less than the limited mufle, indicates the extreme coldness of the animal's abode.



The Shou of Tibet. Cervus Affinis

The pelage, like that of every other strictly Himálayan and Tibetan ruminant, has, as is evident from the covering of this head, a harsh, brittle, quill-like character, and probably, on the body of the animal, also a wavy structure; for, on the head this last feature of such pelages is always wanting. The hair of the head is straight and copious, devoid, as usual, of the fine woolly subfleece proper to the body, and on the crown of the forehead it has a length of 3½ inches. The colour of the hair, like its quality, is that so common to the ruminants of Tibet, namely, a purpurescent or embrowned slaty blue passing into paler or grey slaty on the less coloured parts, and terminated externally or tipt with fawn or luteous buff passing into canescent fawn. The orbits and lining of the ears are nearly or quite white, and the lips show a ruddy ocherous tinge void of any dark marks.

The scull, which is 17½ inches long to the jut of the occiput and 6½ inches wide between the outer angles of the orbits (in rectilinear measurements), has the frontals broad, flat and a little hollow before the bases of the horns; the orbits salient and extending laterally beyond the zygomatic arches; the nasals compressed and somewhat arched lengthwise; the cavities for holding the larmiers large and perforate, but less so than in the Rusas; the horn-pedestals low and thick; and, lastly, the occipital plane wide in proportion to its height, and oblate hemispherical in shape. The horns, of a size greatly inferior to those priorly given, originate remotely from each other below the summit of the frontals, spread very amply in their ascent, and recline a good deal before they begin to ascend. The colour of the horns is brown, and their surface is smooth. There are two basal, one central, and one terminal snags to each beam. The former or basal snags of each beam are proximate and parallel to each other, have an anteal external insertion, and a horizontal direction, with the tips of all four bent uniformly upwards. The two inner ones lean directly over the eyes and side of the face, and the two upper and outer ones run, almost parallel, outside of the former which they somewhat exceed in size.

The central snag is the smallest of all, placed equidistantly from the lower and upper snags, inserted on the outside of the beam, and directed forwards and outwards with the lip reverted, as in the basal snags. The apical snag also starts from the outside of the beam, but has an upward direction and little divergency from the beam, which

is decidedly longer, though not thicker, than this terminal snag. The result is a simple fork instead of a crown of snags; and, this being my third fine specimen so characterised, I have now no doubt that the simply forked summit is normal as before conjectured; and also, that the species is identical with my affinis, the trivial differences therefrom, noticed in the prior sample of the Shou, being no longer forthcoming in this.

The subjoined sketches and measurements complete what I have to report respecting the present sample of this splendid Stag.

Dimensions of horns.

	Feet.	Inch.
Greatest length, along curve,	3	10½
Girth just above burr,	0	7¾
Chord of arc or bend of beam,	1	0½
Basal interval between burrs,	0	4½
Terminal interval between apical snags,	3	9
Terminal interval between tips of beams,	2	6½

Dimensions of scull.

Length, from symp. interm. to jut of occiput, straight,	1	5½
Length from symp. interm. to fore angle of orbit,	0	10½
Thence to jut of occiput,	0	8
Greatest width between posteal angles of orbits,	0	6½
Length of series of upper molars,	0	4¾
Interval of foremost molar and the canine,	0	3
Canine to front of jaw or symp. interm.,	0	2⅛
Diameter of orbit,	0	2⅛
Extreme length of nasals,	0	6½
Ditto..... of frontals and parietals,	0	8½
Breadth of occipital plane,	0	5¾
Depth of ditto,	0	4
Teeth of upper jaw,	16	0

P. S. The present specimen was killed in the district of Chúmbi which is more wooded and less arid than most other districts of Tibet. To the north Chúmbi adjoins Phári and other parts of Ding-cham vel Damsén whence came the priorly described specimen of the Shou. Chúmbi is the basin of the Máchú vel Torsha river which rises from the western flank of Chúmalári.

Translation of the "Vichitra Nátak" or "Beautiful Epitome,"—a fragment of the Sikh Granth entitled "the Book of the Tenth Pontiff." By Captain* G. SIDDONS, *1st Cavalry.*

CHAPTER I.

THERE IS ONE GOD.

Oh good and holy One! by Thy favour I commence this beautiful Epitome of the verbal declarations of the ten pádsháhs.†

To Thy power I am obedient with my whole heart, and shall complete this work if thou deignest thine assistance.

THE PRAISE OF TIME.‡

Thou dwellest in Heaven and upon earth,
Thou destroyest armies of wickedness,
In war thou art ever victorious,
Ever Superior.
Thy power is not only great, but perfect,
Thy refulgence is incomparable,
Thy brilliancy is illimitable,
Equal to the Sun's.
Thou comfortest all who are virtuous,
Thou correctest every evil precept,
Thou puttest to flight all iniquity:
My hope is in thee.
Noble Creator of the world, all hail!
Who mercifully protectest the good,
Who bestowest thy favours upon me,
To thy second, all hail!
Even one brightness
Ungenerated,
God above all gods,
King above all kings
Incorporeal,

* *N. B.*—Govind Sing, the last of the Padshahs wrote this Book.

† The ten Pádsháhs or Gúrús are 1, Nának, 2, Angad, 3, Amaradás, 4, Rámadás, 5, Arjún, 6, Hargovind, 7, Harkishan, 8, Teghbahádúr, 9, Haráh, 10, Govind Sing.

‡ God the Supreme Being, is personified by काल or time.

And everlasting
Formless and spotless
Parent of each age.
Exterminator! I bow to thee.

Without body, unchangeable, eternal, boundless, never aged, peculiar, never infantile, never youthful, neither rich nor poor, invisible, unmarked, without colour, passionless, illimitable, without countenance, nameless, houseless, playing with fierce brilliancy, never hostile, without counterfeit, more devout than all Jogis, essentially pure. Invincible, fearless, desired by all, never-fated, undisguised without commencement, yet infinite, perfect, bearing no enmity, primeval, friendly, filled with abundance, glorious, tranquil, without affection, without deceit, impartial, chaste, amiable and omnipresent. Vast, pure, invincible, ancient, before all that has been and that will be, who knoweth neither sorrow, nor anger, always new, unborn, aiding, well acquainted with all things. Thou knowest of the past, the present and the future, obedience to thee, oh unchangeable One, never infirm. Obedience to thee, thou God of gods, thou King of kings, who desirest power from no one, thou eternal One, greater than all the potentates of the earth! Indescribable, inexhaustible, friendly, sanctified amongst saints, desiring nothing, the chief of every enjoyment.

Sometimes thou art as the principles of truth, of passion or of ignorance. Sometimes thou appearest as a man, sometimes as a woman, sometimes thou art as an angel, at others, as a devil; it often pleaseth thee to assume various forms. Sometimes thou blossomest as a lovely flower, or thou art a bee and goest thy way buzzing; sometimes thou speedest on the swift wings of the wind. How can I tell of thee who art indescribable?

Sometimes as an echo thou reverberatest pleasantly, now as a huntsman thou killest with arrows. Sometimes thou art a stag, which approaches the snare, sometimes thou art more beautiful than the God of Love. No one can tell what form it may please thee to assume, nor where thou residest, nor what disguise thou wilt choose to go about in, none can call thee by thy name. Alas! how can I tell of thee, who art indescribable? Thou, who hast no Father, nor Mother, nor brethren; nor sons, nor grandsons. Thou, who wast never nursed;

without family, kindred, or friends, without a house, without an army, without followers. Powerful over all kings, Lord of all lords.

MIGHTY TIME!

In thy left hand is a bow, in thy right a sword exceedingly bright in appearance; thy teeth are firm set, and innumerable, they devour thousands. Thy kettledrum is for ever sounding, a white canopy is above thy head, thou art ever merry, and thy diadem glistens brightly, thy voice is tremendous, and thy horn resounds like the howlings of the damned amidst the flames at the judgment day.

Time's bell sounds louder, than Heaven's thunder,
The sea, so mighty, hears it and is still;
His necklace ringing, his anklets' jingling,
Tho' loudly sounding, create no alarm,
How bright his chaplet! Siva sees it abashed,
It's colours resplendent, perfectly chaste,
And his gold earrings charm all who behold.

Time created all classes of things. Mammillary, oviparous, viviparous, mineral and vegetable. He is the Maker of the world and of every portion of the four quarters; he made the earth and the ocean. He composed the Védas, the Korán and the Puráṇas. He formed the day and the night, the Sun and the Moon, Angels and Devils, and warriors; with his iron pen, He marks each man's fate on his forehead. The most powerful succumb to Time!

He has produced many, and exterminated many, and reproduced, but to destroy again. Who knows the extent of his kindness, which thousands have experienced and daily are experiencing?

Time has fashioned many like Krishṇa; he has created and destroyed several like Ráma; Mohammads likewise in abundance, who, when their days were numbered, died. How many wise men have passed away; but Time who conquers all and every thing, remains unvanquished still. Rámas, Krishṇas, Vishṇus, all have vanished from the face of the earth, but Time remaineth yet!

The dwellers in heaven, the inhabitants of the moon, have, in their turns, been destroyed by time. Every Sage and every Philosopher must submit to his devouring jaws. From the days of Mándhátá even until now, every prince has been and is subject to Time.

He pardons those who worship him, but condemns the wicked.

His shining scimitar instils terror,
His anklets resounding are heard afar,
His locks are lovely, and he hath four arms;
Even death crouches beneath his weapons;
He hath a flaming tongue, and dreadful teeth;
His shankh,* so noisy, fills the world with dread;
Dark is his visage, yet with all, at full,
Of beauty, as his attributes are chaste.

The canopy above Time is white and lustrous, and the sun is humbled in comparison with his splendour. He hath large red eyes, whose pupils are like the luminary of day, they gaze upon myriads.

His countenance is so beautiful, that the proud daughters of the gods cannot compare with it. Sometimes he seemeth a warrior, who taketh his bow in his hand, or as a King, who soundeth his loud kettle-drum. When armed, the bravest heroes fly from before him. He handleth his sword like a powerful warrior. He is mighty in battle, and to be feared, nevertheless he is an ocean of mercy,—always kind, always consistent. Kings tremble when they hear thee, the world is thy garment, those who believe in thee will be forgiven. Thou resemblest a black cloud, whose loveliness is perfect, nevertheless thou hast four arms, and when thou holdest the club, the mace, the shankh and the discus, thou art terrible.

Countenance unequall'd
Excelling the God of Love,
Loveliness unrivalled,
Coveted by all mankind,
Forehead like the full moon
Which humbles even Shéo,†
With his snake-like necklace.
Time reproveth the sinful.

Arm'd with a scimitar
He scourgeth evil doers.
He hath a massive club.
And bendeth the pliant bow.

* Conch used by Hindu gods as a war-horn.—Ed.

† Shéo (*Siva*) is represented in Hindu mythology as wearing a snake round his neck.

He soundeth his loud shank,
And his bell'd girdle ringeth.
Oh Lord! I bow to thee,
Accept my humility.

Thou hast various forms,
And the great gods are alarmed,
Thou art above all Gods,
The Prince of benevolence.
Thou art the First, and Last,
With attributes infinite;
Sin sees thy flaming sword
And trembling tries to escape.

Time holds the sword and bow,
All foes he putteth to flight,
His person is so bright
That I am fascinated,
His anklets sound loudly
And create a strange noise,
He is bright as lightning,
My love for him is sincere.

The sound from thy anklets is pure, very pure,
Thy face flashes like lightning, like lightning,
Thy voice is of the loudest, the loudest,
Like the cub in the forest—the forest.

Thou art the past, present, future,
And only solace in this iron age.
Thou art present everywhere
With thy bland and delighted countenance.

In thy head are two savage teeth
Which frighten away all thy enemies,
When angry thou seizest a sword,—
Devout and brave men shout forth, Victory!

Thy armlets and thy anklets sound,
And mountains tremble at thy heavy tread,

Thy girdle and thy gong are loud,
Spirits and mortals all marvel at thee.

Thy wheel revolves throughout all space
And none can check, or hasten on, its course.
Thy mandates who can disobey
Amongst the dwellers of the earth, the sea?

Time's wheel perambulates the whole universe; who is there that can disobey Him? To what Fort, however strong, can we flee to escape Him? Oh Time! thou dancest perpetually round all.

If Time chooseth to consume you, plan what you please, you cannot avert the stroke. You may wear a thousand armlets, and mutter as many charms, they will be of no use without Time's assistance.

Time destroyeth men who incessantly deal in charms; men have spent their lives in searching for charms, and at last have found nothing! have effected nothing!

There are many who hold their noses* when they pray, and adopt other absurd religious customs which are all perfectly useless: no good can result from them.

Madhkítab was a powerful demon, but he became subservient to Time. There were also Súmb, Nisamb and Anaut-bíj, whom Time hath destroyed.

There were the Rájás Prith and Mándhátá, the Lords of the earth, whose chariot wheels traversed the world, also the Rájás Bhoj, Bhim and Bharat who conquered the remainder; but Time hath subdued them all.

Where are the mighty who proclaimed their orders to the world? The powerful who wrested the dominion of the earth from the Ch'hettris? Whose sacrificial rites were pompous and imposing, and whose fame was notorious? They have all yielded to Time.

How many strong Forts have been taken, how many strongholds destroyed? Brave men's praises have been sung, and the history of great battles recorded. How insignificant are all compared with one blow from the hand of Time!

In past ages there were mighty Monarchs, who revelled in every

* A common custom amongst the Hindus, as an attitude of prayer.

conceivable enjoyment, until humbled by the decree of Time, they walked bare-footed.

There was one* who had subdued the universe, and forced the Sun and Moon to stand as sentinel at his gate! There are who have conquered Indra and loosed him again, but their power is nothing compared with the Power of Time.

There have been many Rám's; they are dead,
And many Krishns who have passed away;
There have been mighty gods, who have perished;
Noble intellects too, which have faded;
Deities, who no longer are immortal;—
All, all subdued by Time's o'erwhelming pow'r.

Time overcame the potent Nrisinh;
Who punish'd others, have been punish'd too;
Even the pious Brahman bends to Time
Who the first Av'tar did annihilate.
Relentless Time, all grandeur hath absorbed,
Yet doth he pardon all who worship him.

There is indeed no avoiding the angry effects of Time, but by serving him. Be you gods, or kings, or nobles, or rich, or poor, there is no hope, but in Him. All creation is subject to the will of all powerful Time. You may perform a thousand ceremonies, and make as many sacrifices, but unless you dedicate yourselves to Time, you have no chance of escaping from his power.

Time is all-powerful, destroying equally the rich and poor. The dwellers in heaven do not escape from Him. Those prosper who believe in the power of Time, they thrive who worship Him. The gambols of Time are innocent, his countenance is without parallel. Sin sees it and departs.

He hath large red eyes. He forgives sinners. His face is like the full moon. He is merciful to the wicked.

All the dwellers upon earth are subject to Time, who rules Indra, the Sun, and the Moon.

* Rájá Rávan is said to have made the *Sun and Moon* stand still. The Hindus never do any thing by halves, and Joshua's miracle is simple when compared with Rávan's!

The wheels of Time, to whom all bow, roll throughout the universal world. Ráma, Krishṇa, the Sun and the Moon,—all acknowledge the supremacy of Time.

Krishṇa, whom the world even now so lauds, Brahmá, Siva, Jogis, Gods, Devils, celestial musicians, snakes, the four Divisions of the World,—all originated in Time, and are subservient to him. Time alone is independent of every thing.

[*Note.*—Here follow a string of praises, which have already been translated: indeed the Vichitra Nátak abounds in repetitions.]

Protect me, who resemble the stubble in the field, there is none that assisteth the poor like unto thee. Oh! pardon my offences, though I am always erring. Their coffers are never empty, who serve thee. I trust in Time's powerful arm for protection in this Iron age.

In one moment Time destroyed millions of demons, like Sumb and Nirsumb. In an instant he overthrew Tambarlochan and Chaṇḍ, and Múṇḍa, also Chámа, Baktachen and Sañkhchúr. So mighty is Time! I regard none, I care for no one but Time.

Time hath annihilated Múṇḍ, Madhkitab, Múr, Ag, and thousands like unto them; who scorned to cover their bodies with shields, whom water could not drown, nor fire consume, at the sight of Time's sword, they fled.

In one second Time vanquished Rávan, Mherávan and Kúmbhkaraṇ, also Bárud, Nádh and Akampan, who battling successfully against death, conquering Kúmb and Sakúmb, and devastating the whole world, at length washed their reeking blades in the seven oceans. The most mighty, succumb to Time.

If it were possible to avoid Time, whither wouldst thou fly? His sword is ever before thee, whither wouldst thou wander? His sword is ever near thee! The thing hath not yet been begotten, over which Time hath no controul. Idiot! if therefore thou canst not escape from Time, wherefore do you not cheerfully fall down and worship Him?

Many worship Krishṇa and Vishṇú, and profoundly venerate Brahmá, Mohammad, and even the ocean, but they have not escaped from Time, their devotion has not profited them a cowrie, their sacrifices have gained them nothing. When Time willed it, they died. Why do ye waste your labours, oh ye vain worshippers? Ye toil

without profit, and they who promise to save you from Time, cannot save themselves. The wrath of Time is like a raging fire, over which the gods you worship are hanging by their heels, and can they prevent your being treated in the same way? Oh fools! ponder on these serious truths, and be ye sure that without the mercy of Time, naught else can avail ye.

Oh thou egregious animal! why dost thou not acknowledge the power of Time, which ruleth the universe?—Time, the Supreme Being, who alone is able to pardon? It were best that ye sin not at all, but if ye must sin, sin for the benefit of others, and putting away all your other faults, fall at Time's feet. How can it avail thee, that thou prostratest thyself before a stone idol?

What avail thy reserve, thy fits of abstraction, thy ornaments, thy paint, shaving the hair of thy head, or plaiting it in thick folds? Listen to me from your innermost hearts, for I tell you the words of truth, unless ye diligently search for Time, the giver of all good things, and humbly worship him, ye shall not find him: circumcision is hateful to him.

What if ye could turn the regions of the earth into paper, and the seven oceans into ink, every tree into a pen, with Sarasvatí to dictate, and Ganesa to write for a million of years, ye could not gainsay the simple fact, that excepting by entire submission to Time, ye cannot get his mercy and pardon, or please him in the least.

Chapter II.

How doth God exhibit his merciful Power? By causing dumb people to preach the Scriptures; by enabling cripples to climb mountains; by making blind men see, and deaf men hear!

Oh God!

A worm like me cannot reveal
Thy might, which thou alone dost know.
Who hath ever seen his sire born?
Who can explain thy mysteries?
Thou createdst thine own greatness!
Which no mortal tongue can describe.
Thou alone knowest thine own mercy,
None can exalt, none lower thee.

Seshnág, he hath a thousand heads
And twice one thousand ready tongues,
With each of which, he sings God's praise,
But hath not told it all, as yet!
God's mercy is too abundant
For mortal man to understand;
Vain is the task to picture him,
Whose greatness, all must acknowledge.
Assisted by his gentle love,
Most truly, all things I narrate,
And now about myself, I write,
I come from the tribe of Sodi.
Hitherto I have failed to expatiate at length
On subjects which nevertheless interest me
Much; it is now my intention to be a little
More discursive: so listen all of ye.
When Time first spread himself in space
The Universe was created,
Kálsen was formed, of figure
Indescribable, but lovely.
The second Rájá was Kálkét
And after him Krúr Baras.
The fourth, was call'd Kál Tojár
From whom came the race of mankind.
He had a thousand eyes
He had a thousand feet
He slept upon *Sésh* Nág,
Sésh Sáyi thence was named.
Lo! from one ear he drew some wax
And thence Madhkítab quick was born,
Then from the other he took more,
With which, the giant world was made.
Powerful Time, then Madhkítab slew,
Whose fat, mingling with the ocean
In portions of the sea congealed,
And thus produced was, the earth.
And in those first days, all who were

Virtuous and good, were call'd gods.
And those, who perform'd bad actions
Were denominated, devils.
Were I to tell, of all that happen'd
My volume would exceed in bulk.
Enough! there were many Rájás
From whom sprung celebrated Daksh.
He reared ten thousand daughters
Of beauty, not to be surpassed.
These, by Time's indulgent favor
Were married all, to Rájás.
Binatá, Kadrú, Dit, Adit,—
All four, to Rikki were married
From whom proceeded Gaḍuḍas,—
The tribes of snakes, gods, and devils;
They also, the sun did produce,
From whom a numerous offspring came,
Whose names, were I to detail them,
Would make my work prodigious.
The tribe of Rag'h, so by the world call'd,
From the sun, lead its origin.
And Aj, was the son of Raghú,
He was great and cherish'd the earth.
When, becoming absorb'd in God,
He gave his kingdom to Dashrath,
Who also, favoured his people,
And woo'd, and wedded three Virgins.
These bore him, Rám, also Bharat,
Again Latchman, and Shattr Ghan,
They lived for many years, and when
Their days were numbered, passed away.
Sitá had two sons, who were kings,
And ruled, with wisdom and justice,
These married two lovely maidens,
From Madrdésh,* and both were devout;

* मद्रदेश the ancient name for the Panjáb.

They founded two splendid cities,
One called Kapúr and one Láhor,
Not Lank,* nor e'en Amrávati†
So famed, with either can compare.
Both kings ruled for many a year,
At length, they were caught in Time's net,
And dying, bequeath'd their lands
And virtues, to their progeny,
Whose descendants are numerous,
For four ages they peopled the world.
Among them, were Kálket and Kálrái
Whose progeny is quite countless.
Kálket was very powerful,
And expell'd his gentler brother
Who wander'd till he reach'd Sanand,
Where he married the king's daughter.
From them, proceeded Sodi rái,
And Sodi rái gave origin
To the famous Race of Sodi,
Which God loves, and hath sanctified.
Their kings have always wisely ruled,
And conquer'd kings of ev'ry land.
Their creed is known, throughout the world;
A canopy covers their heads.
They have made large sacrifices
And have subdued the kings of empires.
They have sacrificed houses,
And had atonement for their sins.
At length, the seeds of strife were sown
Amongst them, which no one could uproot,
Arm'd bands collected every where,
The most disastrous war commenced,
Horrid strife, for lands and wealth,
Strife, for the riches of the dead!

* Ceylon.
† Heaven of Indra.

Folly, disputes and sinful pride,
Lust and anger, made the world corrupt.
Wealth! money! all cried out for wealth!
The very world became its slave!
The wealthy alone were worship'd,
Gold was the Idol men revered.

Mankind ceased to venerate *the* God, they harboured animosities, and pursued Folly and Strife with avidity: they were dead to every thing but wickedness.

Thus I conclude the 2nd Chapter, which contains the history of my race.

(To be continued.)

Analysis of the Béngali Poem Ráj Málá, or Chronicles of Tripurá.

By the Rev. James Long.

Dr. Wise of Dacca having presented to the Asiatic Society the Ráj Málá, an ancient Historical poem in Bengali verse, I was requested by the Society to report on it, and also to furnish them with an analysis of the original for the Journal, in order to enable the members to judge of the subject of the poem itself. I hope one day to see the Bengali printed, as though interspersed with a variety of legends and myths, it gives us a picture of the state of Hindu society and customs in a country little known to Europeans,—Tripurá, the Highlands of Bengal, the last country that yielded to the tide of Moslem invasion, and which in its mountain fastnesses retained for so long a period the Hindu traditions unmixed with views that might stream in from other countries. It had been long the chosen abode of *Sivism*, the aboriginal religion having been supplanted by the latter system, as is indicated by the myth which represents *Siva* destroying the Asura Tripurá, and Tripurá as being the favourite residence of *Siva*, a *pithasthán*—the right leg of Sati having fallen there. The Bráhmans exercised as arbitrary sway over the minds of the hill chieftains as ever did Druid on the customs of our Celtic ancestors.

"The embroidery of imagination does not entirely conceal the groundwork of truth." The remark made by Richardson, the compiler of the Persian Dictionary, is fully applicable to such works as the Ráj Málá, the

Raghu Vañsa, &c. "The Sháh Námá, like Homer, when stript of the machinery of supernatural beings, contains much of true history, and a most undoubted picture of the superstition and manners of the times." In all the great historians of antiquity we have facts mixed up with fable, yet we do not reject Roman History notwithstanding the fictions connected with its early history, nor European history on account of the tales told of Charlemagne under the name of Turpin,—why should we not make the same concession with respect to the events connected with Ráma Chandra, the Peter the Great of his day? Ráma's invasion of the South is as firmly established a point as the Norman conquest, and his invasion of Ceylon is as authentic a fact as the siege of Troy. In truth the career of Ráma was one of far greater interest and importance to masses of mankind, than the foray of petty Grecian kings, though dressed up by the magic pen of Homer.

The professedly historical documents of the Hindus are few and meagre. It is chiefly by the clues given in such works as the Rámáyaṇa and Mahábhárata, where fact is blended with fable, as in the novels and poems of Sir W. Scott, that we can grope our way. Yet important data may be elicited even from such writings as these by careful investigation, as was effected by Todd in his Rájasthán, who obtained such useful materials from the poems of Chand and other bards of Rájputáná. Lassen in his valuable work, the Indische Alterthumskunde, has poured a flood of light on the ancient history and geography of India, derived from the references in the Mahábhárata; he has by a skilful analysis extracted, from a large mass of beautiful and interesting poetry, references which will be of great use to the historians of India, and has thus shown that Sanskrita poetry is not that aggregate of absurd and monstrous fiction that some would consider it to be; for instance the Rámáyaṇa has for its basis the expedition of Ráma to the South, who was the pioneer of civilization to the barbarous aborigines of the Dekhan. Like Peter the Great of Russia, he was obliged to use rough means with a rude people, in order to raise them to a higher status in society; Ráma played as important and useful a part on the world's theatre as either Æneas or Agamemnon, the familiar heroes of College reading.

The *Ráj Málá* or annals of Tripurá were compiled by Bráhmaṇs or the *pradhán mantris* of the Court of Tripurá. Though many of the Rájás despised writing as being what they considered a mere mecha-

nical art, yet like the Chinese emperors they provided for a record of the history of their empire by employing a bard in their Court, and though he bestowed lavish encomiums on the characters of the reigning monarch, yet he affords us information occasionally on various interesting points. Thus for instance the women exhibit a very different character from those of Bengal generally, and in daring and moral prowess remind one of the females in Rájputáná or the Máhrátta country, though we have no account of any equalling Ahalyá Báï in benevolence.

The Rájmálá or history of Tripurá comes in opportunely at the present time, when such an anxiety is shewn by *Savans* to throw light on the manners, religion and history of India previous to the Mohammadan invasion, and also from the country described in the poem presenting various points of interest, whether we look at its position, having the Buddhist kingdoms to the South, the Chinese empire in the East, the ancient kingdom of Kámrup in Assam to the North, or the aboriginal tribes of its frontiers. Its mountain fastnesses and lonely jungles enabled its chieftains, like the Welsh of former times, or the Hugonots of the Cevennes, to maintain a spirit of resistance to intruders, and to preserve down to the last century Hindu manners and customs uninfluenced by the control of Moslem propagandism. Its rulers pride themselves on being of the lunar race, and in their descent from the chivalrous Kshetryas of Rájputáná* whose lofty bearing and prowess have been immortalised by the pen of Todd and Chand. While in Bengal the tide of foreign invasion has swept away almost all the ancient Hindu royal lines, the families of Vishnupur and Tripurá have alone remained, though now "in the sere and yellow leaf."

The baleful influence of the Musalmáns on Hindu nationality has in no instance been more destructively exercised than in its having prevented during the Moslem sway all Hindu efforts for the formation of a vernacular literature. Animated by the same recklessness and disregard of consequences which prompted the Norman conqueror to aim at the extirpation of the English language, the Moslem conquerers discouraged the use of every tongue but their favourite Arabic or Persian. This added to the proud disregard in which the *Prákrita*, the dialect of women and Râkshasas, was held by the

* Todd in his "Rájputáná" states, that Tripurá was one of the 84 mercantile tribes of Rájputáná.

Bráhmaṇs, is the cause why we have so few works in Bengali of an ancient date; Kírtibas's translation of the Rámáyaṇa, made two centuries ago, and the works relating to Chaitanya, are almost the only "fragments from the wreck of time" handed down to us.

That Noble Institution Fort William College,—though now shorn of its splendour, through the mercenary utilitarian policy of men who in the pride of Western assumption have frowned on such efforts to cultivate the classic tongues of the East,—fostered a few works treating of the history of this country: Ráma Lochan published his beautiful little work, a model for Bengali style, the history of Rájá Krishṇa Chandra Ráya of Nadiyá, which presents various interesting sketches of Bengal at the period of the battle of Plassey. The history of Rájá Pratápáditya of Jessore, compiled by another pandit of the same College, also gives us details respecting the Eastern part of Bengal two centuries ago, and of the large settlement and colony formed by Rájá Prátápáditya in a Sunderbund district to the South of Kálná. The Assam Buraṇjí is also of some use for historic purposes.

These are composed in Bengali, but there is one work translated into English from the Persian which gives us more information respecting the state of Bengal in the last century than any book that has been published yet, the *Seir Mutákharin*, which admits us behind the scenes in the Murshidábád Durbar, and paints to the life the manners and customs of the Bengal Moslems of that period; it was written by an eye witness, who, like the compilers of the *Ráj Taraṇginí* or Chronicles of Káshmir, has not shunned to point out the vices of men in high station.

The *Ráj Málá* is a curiosity as presenting us with the oldest specimen of Bengáli composition extant, the first part of it having been compiled in the beginning of the 15th century, the subsequent portions were composed at a more recent date. We may consider this then as the most ancient work in Bengali that has come down to us, as the *Chaitanya Charitámrita* was not written before 1557, and Kírtibás subsequently translated the Rámáyaṇa.

The first part of this *Ráj Málá* treats of THE TRADITIONAL PERIOD OF THE TRIPURA KINGS, which is mixed up with various mythological accounts; it informs us that the ancient name of Tripurá was Kirát (the Hunter) from a person of that name of the Lunar or Indo-

Scythian race, the brother of Puru, who was banished to the Eastern provinces by his father Yajáti who held the *Samráj* or supreme government of India. He built a city named Tribeg on the banks of the Kupal (Brahmaputra) and subsequently abdicating the throne, he retired to the jungles to devote his life to religious objects. His son Tripurá succeeded him, a profligate tyrant who oppressed the worshippers of *Siva*; his subjects reduced to poverty emigrated to Hirambu (Káchár), but returned after five years, as Hirambu the Rájá of Kámrup gave them no aid. On this they became votaries of *Siva* who promised them a son named Trilochan by the widow of Tripurá, who would be successful, provided he adhered to the worship of the Sun, and Moon, and that they worshipped at break of day, on certain occasions, the fourteen gods, i. e. the Sun, Moon, Himálaya, Kámadeva, Fire, Ganges, Water, Prabhá, Ganesha, Kártiká, Brahmá, Sarasvatí, *Siva*, and Vishnu. In the course of time Trilochan was born and placed on the throne with the unanimous consent of the people, who waved two sacred banners over his head; he was distinguished for his wisdom, and the neighbouring kings paid him homage when he was ten years old: the Rájá of Hirambu offered him his daughter in marriage; he proceeded to Káchár where the marriage was celebrated with great pomp, and for nine days, food was supplied to every one at the king's expense: twelve sons were the fruit of the marriage.* Kámrup, called also Prágjyotisha, the *Kámákhyá* of Sanskrita literature, the region of love according to the Hindus, is famous from an early date; Bhagadatta king of Kámrup is mentioned as a warrior in the Mahábhárata; 18 centuries ago marriage alliances were formed between the royal families of Kámrup and Kashmir, the boundaries of the country were extensive, reaching South of the Brahmaputra from Bontáli to Kapálimukh, and on the North from the Karatyá river to the Díkolai. An account of Kámákhyá is given in the Káliká Puráṇa: it was the Káli Ghát of North Eastern Bengal.

On the death of the Rájá of Hirambu, a dispute arose among his grandsons as to who should succeed to the throne. On this Trilochan

* The heir to the throne of Tripurá has been always selected from this family, the family marks are a "middle size with a nose of moderate proportion, round body, ears well formed, large chest, small belly, with a neck like an elephant and legs like a plantain tree, arms round as a palm tree; these bodily qualities are to be combined with devotion to Vishnu and *Siva*."

sent a messenger to the Dandis or priests of the famous College of Mahádeva in Ságar island* to state that Surjya would be present to listen to their prayers when they worshipped the fourteen gods. These priests refused at first to go to Tripurá until they heard that Tripurá, an enemy to the Bráhmans was dead, and that Trilochan his successor being a devotee proposed going to Ságar island to convey them to his kingdom, attended by a large retinue. On their arrival they performed the usual ceremonies to the fourteen gods, together with the offering of buffaloes, ducks were sacrificed which were collected by the Keráts and Kukis. On the great day of the festival all the gods assembled with the exception of Vishṇu, the *Dandi* went to invite him, he came, and together with the other gods was so pleased that they promised always to protect the Tripurá Rájá. Trilochan after conquering various countries visited Yudhistir. He lived to an advanced age and was diligent in performing the following ceremonies, *Durgá-Pujá, Dol-Játrá, Jal-Játrá, Surjya-Pujá, Padma-Pujá, Bisava Sankránti.*†

* The temple of Kapil Muni stood in Ságar island since A. D. 430, but it was washed away by the sea in 1842; the island itself was once densely populated, and contained a population of 200,000, which was swept away by an inundation in 1689. I saw in the *Bibliotheque Royale* at Paris a Portuguese map of Bengal, drawn three centuries ago, which gave the name of five cities to the East of Ságar island on the borders of the sea, the ruins in the Sunderbunds confirm the truth of this description. Mention is made of Ságar island in the Mahábhárata 2600 years ago at least, which shows the antiquity of the shrine there: at that period the Ganges probably disembogued itself into the sea in that direction, flowing down near where Calcutta now stands. The point of confluence with the Ocean would give a sanctity to Kapil Muni's shrine which has been the resort of pilgrims probably long before the Christian era. The Ráj Málá states that the Dandis or Sannyásis "resided in the College of Siva in seclusion for their spiritual benefit, they bathed at day break, dried their clothes by exposure to the air, cooked their own food and were acquainted with all the mantras."

† Several of these *pujás* are not now in use, the *Surjya-Pujá*, like the *Agni-Hotra*, or maintenance of a perpetual sacred fire, has become obsolete; the last man of eminence we have heard of who observed it was Rájá Krishṇa Chandra Raya of Nadiyá, last century: it was one of the few remaining relics in the existing form of the Hindu religion which kept up a remembrance of the link between the ancient elementary worship of the Vedas and the Fire worship of the followers of Zoroaster. Hinduism can adapt itself to changes of circumstances, thus of late years we see the worship of *Olá-utá Debtá* or the goddess of Cholera.

Dakkhin succeeded in accordance with the wishes of the people and of his father Trilochan, but the eldest son was much annoyed at his brother's receiving almost an equal share of his father's property, only two being reserved for him and also that he did not succeed to the throne, being in Kachár at the time of his father's death. He in consequence declared war and gained a victory after a battle which lasted seven days, the eleven brothers fled to the Khalansha river where they founded a settlement. The brother died in a good old age when he was preparing to abdicate the throne in consequence of a rebellion that broke out.

Fifty-six monarchs succeeded him, whose names alone survive. Kumár, the fifty-seventh in succession visited Samalanagar "the dwelling place of *Siva*," who at that time fell violently in love with a Kuki. On *Siva*'s wife hearing of it, she kicked the woman so violently as to break her neck. The Linga worship was in vogue on the banks of the Manu, but *Siva* vexed at the increasing wickedness, and at Rájeshwar, the 60th king of Tripurá in succession, shooting an arrow at his lingum because a son was refused to his prayers, declared he would no more visit Tripurá, though his foot marks should remain in the temples; he stated that the Rájá should have no son to succeed him, yet he promised if he offered up a human victim he would be propitious in other respects: the victim was procured with difficulty, for the people fled.*

Pratit the 69th Rájá, formed a strict treaty of alliance with the Rájá of Káchár on the subject of their boundaries, declaring that "the crow would assume a white colour sooner than they should infringe on each other's limits." The neighbouring chiefs fearing the effects of this alliance sowed dissension between them by means of a beautiful woman† whom they sent to the Rájá of Tripurá; the Rájá of Hirámbu became jealous and threatened to slit her nose and

* This indicates that the practice of human sacrifice could not have been very common at that time, and it also shews it was associated in Tripurá, as in other parts of India, with the worship of Siva.

† The women of Tripurá as well as Asám were not immured and coerced in the same way as Bengali females are; even in the present day in Asám "in most parts of the country the women of rank go about in public, quite divested of artificial modesty." The Burmese and Mug women also appear in public.

cut off her ears, a punishment which is often inflicted by husbands in the present day when they suspect their wives of intriguing. Jajárpha the 74th Rájá, invaded Ráṅgámáti (Udipur). Nikka the king of Udipur with a disciplined army of 10,000 men assisted by the Kuki troops who erected stockades, fought against the Tripurá Rájá, but was defeated, and Udipur was made the capital of Tripurá. During the battle the Rájá in defiance of a prohibition laid on him in the Lochan Charitra against entering a hut, attacked the king of Udipur in one, as the latter entrenched his men in huts, thinking they would not be assailed. This conquest increased the Rájá's power and he proposed to invade Bengal, but had not the means to execute his plans; though his dominions are said to have stretched nearly as far as Amarapur in Burmah. The priests of Siva in his time were noted for their attention to the Shástras, drying their clothes by exposure to the air and then removing them with their own hands. Of the Rajá's immediate successors, little is recorded except that some had no sons on account of their wickedness.

In the reign of the 96th Rájá Sangthafah, a Chaudhuri (or principal man of a Hindu corporation,) having been plundered in Tripurá of money and jewels, which he was going to present as a tribute to the king of Gaur, laid a complaint before the Gaur monarch, who sent a powerful army against Tripurá, the king being frightened sued for peace. On this his wife highly indignant abused him for his cowardice, telling him she would fight for him. She said to the soldiers, Your king wants to act the part of a jackal, let those who wish to engage follow me. The troops all agreed, but first she ordered a dinner of buffaloes' and goats' flesh to be prepared for them by their wives, of which they all ate very heartily, the next morning they ate again and then proceeded against the enemy; after a severe conflict they completely routed the forces of the king of Gaur. After the battle, the Rájá while reposing on the tusks of an elephant* saw a bloody head dancing in the air, which indicated that a lakh of persons had lost their lives.

The queen of Khysángafah the 98th Rájá was acquainted with weaving which produced a beneficial effect on the kingdom. "Her son was so virtuous that he had eighteen sons," wishing to know which of them

* Some of the Hill tribes require their chiefs always to sleep with the head reclining on an elephant's tusks as a pillow.

was destined to succeed him, he one day after fasting directed that the person in charge of the fighting cocks should keep them fasting, while he and his sons were at dinner, on a signal given the thirty cocks were let loose and proceeded to touch the dinner which in consequence became defiled, but the youngest, Ratnáfah, threw some rice to the cocks, this prevented their coming and touching his food, and so decided that he was the most quick witted. He was sent after his father's death to travel, and went to Gaur, where he resided several years and was treated with great respect; returning with the aid of Mohammadan troops, he conquered the kingdom and beheaded his brother. This occurred probably in A. D. 1279, when Togral invaded Tripurá. Shortly after he obtained from the king of Gaur 4,000 troops to garrison his chief places and the title of Mánik, which the Rájás of Tripurá have retained ever since.

Dharma Mánik the 104th Rájá travelled as a fakir through various places; when at Benares his future exaltation was signified by a snake twined round his body with his head reared over his person. This is considered by the Hindus a presignification of future sovereignty; they derive the practice from the period when Bhagaván or Krishna slept in the Khiroda Samudra on the back of the snake Ananta who covered him with his expanded hood. Shortly after this, a deputation from Tripurá arrived at Benares, where they found the prince dressed as a fakir; they stated that the Rájá having died of small-pox, the troops would not allow the youngest son to be chosen in preference to the eldest, and he was appointed Rájá, A. D. 1407, with the unanimous consent of the people. "He soon sought the road to heaven" by presenting lands to the Bráhmans, the titles to which were registered on copper-plates. After a peaceful reign of thirty-two years he died. Under his patronage the first part of the Ráj Málá or history of Tripurá kings was composed. His younger son was raised to the throne A. D. 1439, but was soon murdered by a faction, and his brother was elected king; the generals having always exercised great influence in the choice of a Rájá. By the advice of a priest, who told him leprous limbs ought to be cut off, he feigned sickness and being visited by the commanders he had them killed by soldiers who lay in wait in his palace. The fate of these generals, in the penalty they suffered for their imperious and intriguing conduct, resembled that of the Janizzaries of the Turkish

empire who were cut off at a stroke in 1826 ; like them and the Mamalukes of Egypt, these generals appear to have been always more or less involved in political intrigues. The people of Tripurá like the Sikhs were a military race, and their soldiers often played the same part as the Pretorian guards did in Rome. The Rájá subsequently invaded Bengal (some of his troops were taken prisoners by the king of Gaur who ordered them to be trampled to death by field elephants) ; he took Khandal and plundered it so thoroughly that the inhabitants were obliged to clothe themselves in the bark of trees ; after this he returned and devoted himself to works of charity, endowing lands for Bráhmaṇs, giving marriage portions to their sons &c. ; he dug a large tank at Kamilláh called *Dharma Ságar* which occupied him two years ; he once gave a great feast to the Bráhmaṇs and their relations, they had to cook their own food ; he ordered the commanders of the Kuki troops to count their men, they did so with a stick while they were eating, the Kukis were required by their law to drop eating, but through fear of losing their lives they swallowed the food which was in their mouth,— they have had a nick-name applied to them ever since on account of this.

In the city of Thánaṇsi which was the capital of Tripurá until the marauding expeditions of the Kukis caused it to be removed to some securer place,* a white elephant was caught, the king of Tripurá claimed it as his property, but the Rájá of Thánaṇsi refused to give it up, on this siege was laid to the town which lasted six months. Ráya Chachag the Tripurá General, was very much annoyed at this delay, he told his soldiers to betake themselves to the spinning wheel, and in order to stimulate their exertions he had their houses unroofed so as to let in the cold and rain. One day having caught a *guano* 12 feet

* The Kukis have long been noted for their fierce, barbarous manners : like the Indo-Chinese races they have flat noses, small eyes and broad round faces ; their language has a strong affinity with that of the Mugs, and their tradition is that they and the Mugs are descended from the same ancestor. From their mountain eyrees they have often sallied down on the inhabitants of the plains and their adventures often remind one of the "border raids" so graphically described by Scott. Their history is almost a repetition of that of the North American Indians,—the quarrels of rival clans and occasional forays on the more civilized inhabitants of the plains. They were the Mahráttás of the Eastern districts of Bengal, but had not the energy or perseverance of the *Bargi lok*.

long, in order to find out the most accessible part of the fort, the soldiers tied a string to the animal's body and let it loose, it entered the fort and the string served as a clue to the soldiers who passed into the fort, the guards being drunk; all the males were put to death and the females were taken captive, Ráya Chachag then proceeded to the conquest of other countries to the East, he was accused by the Kukis of an attempt to make Samul an independent state, but was acquitted of the charge. In 1512 A. D. he conquered Chittagong and defeated the Gaur troops who defended it.

Haseyn Sháh sent a strong force from the twelve provinces of Bengal under the command of Gaur Málik, which took the fort of Maharkul; but the Bengal troops were repulsed before another fort. At the suggestion of an eunuch in the Tripurá army they made a dike of *Soná Mati* or red earth across the Gumti and bunding in the waters for three days, they then broke it down—the torrent caused all the Mogul troops to retreat. The Rájá Sri Dhyan in order to destroy the enemy offered up a human sacrifice, a black Chandál boy, to Báhbachari (the wife of Siva) on the banks of the Gumti, the head was thrown in among the enemy;* it is said this so pleased the goddess that at night she came among the Mogul troops and made so loud a noise as to create a panic, and the troops all fled from Chandigar. The Rájá marched on Chittagan, the enemy fled and he proceeded further in his conquests. Hoseyn Sháh sent another army under Hyten Khán to conquer Rángámáti, the capital of Tripurá, after a battle which lasted a day, the Tripurá troops were obliged to retreat; on this the Rájá summoned the Dáïn or witches to know why they did not aid him; the chief witch promised to stop the stream with her body, and then to rise up and let the torrent sweep away the enemy's troops.

* Human sacrifices prevailed at an early period in Tripurá, and even of late years strong suspicions have been entertained of the practice being occasionally observed at the shrine of Kámákhyá in Asám, and at Káli Ghát in Calcutta. But in no part of India were more human victims offered than in Tripurá, which appears to have been one of the strongest holds of Hinduism; the Eastern districts formed favourable settlements for the Bráhmaṇs as is shown by the magnificent architectural remains in Asám of the Hindu conquerors who entered that quarter probably from the North West, while colonies of Bráhmaṇs from Mithilá confirmed by the tie of religion what was begun with the sword.

The historical basis of this myth is probably that the Tripurá troops adopted the same practice as was employed by the Dutch against the Spaniards at the siege of Leyden, viz. breaking down embankments so that the hemmed in waters might sweep away the enemy. The enemy fled, when Hyten Khán arrived at the fort of Sogoria he declared, putting his hand on his head, that he who would conquer Tripurá ought to bring with him double the troops he had, he was degraded on his return to Gaur.

Sri Dharma having returned to his capital Rángámáti, worshipped the fourteen gods with great pomp, and directed that *human sacrifices* should be offered only triennially, in ancient times one thousand used to be sacrificed every year. He introduced musical teachers from Tirhut* and the Tripurá people, soon became proficients in a knowledge of song. He made an image of Bhubaneswarí of gold, weighing a maund, he placed cotton in her nostrils so that at the pujá time when the *Práṇa Pratishtá* ceremony is performed, her breath might blow it away, the people all cried out that a miracle had been performed, though a pipe perforating the body and in contact with the mouth of a priest accounts for the whole, we have many instances of similar tricks in Europe in the middle ages.† The Rájá was a great

* Tirhut, the ancient Mithilá which gave a wife to Ráma, seems in former days to have been a *point d' appui* for the Bráhmaṇs in the progress of their influence from North to South: Nadiyá derived its learning from Mithilá pandits, and the far famed Kámrup in Asám, the Paphian residence, received a colony of Bráhmaṇs from Mithilá, who effected the work of proselytism so effectually that "the priests maintained an authority, more exalted, more extensive than they had been able to engross in any other part of India." The temple of Kámákhyá near Gauháti is frequented by pilgrims from all parts of India, and is the only temple in those parts which boasts of its *Deva Dási* or temple women; it contains, it is said, 5,000 of these.

Though Bráhmanism spread itself in India chiefly by missionary colonies and conquest, yet proselytism was resorted to largely as the histories both of Asám and Tripurá show, it seems in its course from the North to have taken as successive centres of action, Kashmir, Aude, Tirhut and Nadiyá.

† Much injury has been done to the cause of truth by ignorant assertions, such as that the Hindus regard the pieces of stone or clay that they worship to be gods, this is confuted by the fact that the *Práṇa Pratisthá* or infusion of divinity into an idol is a ceremony without which no sanctity is attributed to it, as may be seen at the time of the Durgá Pujá and other Pujás when the idols are flung into the river after the

worshipper of the lingam, and erected many temples; on one occasion after the bricklayers finished some temples, they admitted they could make them of better materials, the Rájá indignant at their not erecting for him the best temples ordered his attendants to put them to death. The Rájá lived to a good old age, a great worshipper of the lingam; he died of small-pox and his wife performed Sati.

His son Déb Mánik succeeded and marched to Chittagong; on his return he offered a human sacrifice: while worshipping the fourteen gods in the place of cremation, the officiating Bráhman induced a man to personate *Siva* and to direct the Rájá to kill his eight champions as a sacrifice, which he did, but soon afterwards finding out that the Bráhman had practised a deception he intended to kill him, but the Bráhman anticipated him and deprived the Rájá of life, giving out that he had been killed by the fourteen gods in consequence of not performing their worship with proper ceremonies. This Bráhman carried on an intrigue with the youngest wife of the late king and the two secured the power in their own hands, but it was of short duration, as the people being indignant with the prime minister assassinated him in his palankin, the pseudo Rájá and his mother were also killed, and were all buried in one grave. The young Rájá who succeeded, finding himself treated as a puppet by the prime minister had him assassinated by one of his favorites who intoxicated him with spirits after dinner. Braja Mánik the young Rájá now made various conquests, the Rájás of Kasyá and Silhet did him homage, the former presented five elephants and ten horses as a mark of vassalage, but the Rájá being vexed at the insolence of the Kasyá prince sent an army of 1,200 Háris or Mehtars, to fight against him with *Kodális* or spades; the Rájá, feeling that great disgrace was to be inflicted on him, persuaded the Rájá of Hirambu to intercede for him, who obtained his pardon and the Mehtars were stopped as they were on their march to Jayntiá.

deity takes its departure from them. This is probably a remnant of that primitive form of Sabian idolatry by which the planets were worshipped as being the residences of certain deities. But whether we regard the defence set up for Hindu idolatry on the Pantheistic grounds, that God being in all matter every thing is part of him, or that idols are symbolic ladders to lead the vulgar from sense to spirit, we see enough to show us that popular idolatry may flourish side by side with a cold system of Deism.

One thousand Páthán horsemen revolted from the Rájá, owing to the arrears of wages not being paid up; they were on their march to Chittagong, and attempted to kill the Rájá and take Rángámáti, but were secured and the greater part were offered up as sacrifices to the fourteen gods. The king of Gaur sent 3,000 horse and 10,000 foot to Chittagong, the war lasted eight months. In one engagement the Tripurá troops lost their general, Mohammed Khán the general of the king of Gaur was however taken prisoner confined in an iron cage and at the instigation of the head Bráhman priest, was sacrificed to the fourteen gods.

At this time Bijaya Rájá of Tripurá marched to Bengal with an army composed of 26,000 infantry, and 5,000 horse besides artillery; he went by 5,000 boats along the streams Brahmaputra and Lakhi to the Padmá; at Sonárgán, where he spent several days revelling in licentiousness, he took into his seraglio many beautiful young women; he crossed the Brahmaputra by a bridge of boats and invaded Sylhet, where he dug several tanks, but his soldiers were very fond of plundering the people and one day they destroyed a village, the natives all fled, with the exception of a woman who caught one of the plunderers by the leg, he tied her by her hair to a post so that she could not move, on her husband returning in his indignation he beat the trooper so severely that he died; the Rájá ordered all the natives of that village to be punished; after making presents to the Bráhmans he returned to his capital Rángámáti where he devoted one day to distributing gifts called *Kalpa-taru,** i. e. whatever request any one makes to the Rájá he is to obtain it, but this is limited to one day and only a select number are admitted into the palace to make application. The astrologer having declared that his youngest son Ananta would succeed to the throne, the Rájá sent his eldest son on a pilgrimage to Orissa. Ananta married the daughter of Gupi Prasád, the commander-in-chief;†

* The Kalpa-taru or *Kalpa-brikshya* was one of the fabled trees of Indra's heaven, eating the fruit of which would effect the accomplishment of any wish, like the *Kámadhenu* or cow of plenty mentioned in the *Raghu Vansa*. The English fairy tales give us a similar object in Fortunatus' wishing cap, while the Arabian Nights abound with references to this. Probably some floating traditions respecting the tree of knowledge in the garden of Eden may have given rise to this notion of the Kalpa-brikshya.

† This man's life shews how men of low origin often rise to power. In these times Gupi was originally the Rájá's Gomásthá at Dharmanagar, while there he

his father soon after died of small pox having reigned 47 years, his corpse was followed to the pyre by a great number of women.

Ananta Mánik succeeded to the throne by the help of his father-in-law the quondam cook, with whom Ananta always dined. After the king reigned 1½ years he was strangled at the instigation of his father-in-law who mounted the throne under the title of *Udaya Mánik*. His daughter demanded to burn as a *sáti* with her husband, but this was refused, she then claimed the throne and was allowed to be *Rání* of Chandipur, while Udaya made Rángámati his capital, which he adorned with beautiful buildings, temples, and tanks, changing its name to Udayapur. He kept 240 wives who were so dissolute that they persuaded not only other men but even the prince of Gaur to cohabit with them, as he was on a visit to the Rájá of Tripurá. When the Rájá heard of it, he had some of them trampled to death by elephants, and others devoured alive by dogs. As the Patáns were marching on Chittagong, the Tripurá troops were sent to attack them, which they did during the night, notwithstanding the unfavourable omens of the flapping of the vulture's wings, falling of fire from the sky and the barking of foxes. The Tripurá troops were routed with a loss of 40,000 men while the Patáns lost only 5,000. The war lasted for five years. Udaya Mánik died five years after this from having taken a poisoned pill of quicksilver given by a woman. At this period numbers died from famine and from disease the result of it.

Jaya Mánik, the son of the late king, succeeded, but only nominally, as his uncle Runág Náráyaṇ had the real power; as the latter saw that Amara Mánik had great influence, he asked him one day to dinner with the intention of intoxicating and then killing him, but a friend at table by cutting the stalk of a pán leaf hinted to him the intention of his enemies, he pretended to be unwell retired from table and went instantly to the stable—but the horse was gone! on this he seized by force the horse of a Khaista and made his escape. He soon rallied his friend's sons around him and proceeded to attack Runág, he provided each of his soldiers with a piece of cloth 9 feet long to strangle their enemies

climbed a tree belonging to a Bráhmaṇ who beat him so severely that he was driven from the place in great disgrace, he became a cook to the Rájá, then a Chaukidár, afterwards having taken an oath on the Sálagrám he was appointed Commander-in-Chief and his daughter was subsequently married to the Rájá's son.

in the same way as Runág had intended to strangle him. Runág being in a fort sent to his brother for troops, but a forged letter was carried by the messenger and the brother was so joyous on receiving it that he prostrated himself on the ground, the messenger on this as instructed, cut his head off and it was thrown into the fort, this so terrified Runág that he ran away to an uninhabited place, his enemies found him subsequently in a tank where he had been for two days immersed up to his chin having his head covered with a rice pot, the head was cut off by a soldier and carried to Amara Mánik who gave him the name of Sáhas Náráyan. Jaya Mánik sent to ask why he had killed his relation, he answered by dispatching troops against the Rájá, who fled and was overtaken: his head was cut off.

Amara Mánik mounted the throne, he was the brother of Bijaya Mánik, his mother was a private individual whom his father fell in love with, struck one day with her beauty as she was drying her hair in the sun. Amara Mánik resolved on virtuous deeds by digging tanks; he ordered all the landlords of his kingdom to send coolies for this purpose, accordingly nine zemindárs sent 7,300 coolies. The zemindár of Taraf in Sylhet refused, an army of 22,000 men was sent against him, his son was taken prisoner, put into a cage, and brought to Udayapur. The Rájá next (A. D. 1582) marched an army against the Mohammedan commander of Sylhet, whom he defeated. The order of the troops in battle resembled in figure the sacred bird Gaḍuḍa, the two generals in the van represented the beak,—the troops on the flanks the wing, and the main army the body; during the fight both parties became fatigued when a suspension of arms took place by mutual agreement; they afterwards resumed the battle, when the Musalmáns were defeated. Sylhet from this time (A. D. 1514) became tributary to Tripurá. The Rájá next defeated the zemindárs of Balarám who refused to submit, on the ground that Amara Mánik was not of the royal line, but he was also defeated. On this occasion a Bráhmaṇ was accidentally killed, which caused great grief through the kingdom and the king made a private atonement for it. After this he sacked the fine city of Báklá and sold the men as slaves. He then returned to his capital and performed a grand ceremony on the completion of his tank as also the ceremony of *túla* or presenting to a Bráhmaṇ gold of the same weight with his own body.

While the Tripurá people were enjoying the seclusion arising from their insulated position a new enemy, the Muhammadans, made their appearance and invaded the country, A. D. 1587. Delay in defending the land was at first caused by the Tripurá commander Issáh Khán waiting for a lucky day, but at last he obtained the consent of the Viziers to furnish him with troops, and he also won the favour of the *Ráni* who tested his sincerity by giving him the water in which she had washed her body: he drank it. 12,000 troops marched against the Musalmáns who fled without coming to action.*

The *Bhát* or *Devils* are said to have been hostile to the Rájá at this time, because he cut down *Bat* trees under which they dwelt, their presence having been known by the trees shaking without any natural cause. When the Rájá cut down the trees, water gushed out which formed a lake and in order to appease the anger of these Devils he offered up human sacrifices, but in vain, on the banks of the tank. The people were greatly alarmed at this time, at the spread of rumours that 125 boys must be immolated to propitiate the devils, and that Udipur and the whole country would be destroyed by an inundation.

The Rájá subsequently declared war against Arrakan, invaded it and took many places, he was repulsed by a junction of the *Mug* troops with the *Portuguese*,† but he regained his ground; the Rájá sent a letter to the king of Arrakan, challenging his troops to battle, the latter replied that he would postpone fighting till next year; the Rájá

* This presents a wide contrast to the behaviour of the Bengalis when invaded by Bakhtiyár Khiliji, the Muhammadans met with no resistance; but this must be stated on the other side that Nadyá was deserted previously by the nobles owing to a conviction that resistance would be vain. However in one place the Bengalis subsequently fought for their independance—on the field of Panduá near the Burdwan road,—the casus belli was—the Hindus finding the bones of a cow which had afforded the materials for a feast to the Muhammadans, in revenge killed a Muhammadan child, troops were marched against the Hindu Rájá of Peruyá, and after a hard contested battle the last spark of Bengali independance was extinguished.

† This is the first notice taken of the Portuguese, though they had come into Bengal in 1566, as mercenary troops in the service of the king of Gaur. They carried on a system of plunder and piracy which would have disgraced even the buccaneers of the West Indies, the desolate state of the Sundarbans, now the abode of alligators and tigers, but once affording a residence to an industrious and numerous population, bear witness to the depredations of the Portuguese.

concurred in this and both agreed to fight before the celebration of the Durgá Pujá, in order that the slain might be offered as sacrifices to Durgá. The Tripurá troops accordingly retired into winter quarters. But Sekandar Sháh the king of the Mugs did not wait for the Durgá Pujá, he invaded and took Chittagau. The Rájá of Tripurá sent an army under the command of his three sons to repel them. On this the king of the Mugs wished to make peace and sent the brothers a crown of ivory as a present, a dispute arose among them as to who should possess it, and one who lost it abused the Mugs. This led to a battle, the Mugs were defended by stockades, and on Jagier, one of the Rájá's sons, attempting to mount a wounded elephant, the animal maddened with pain, seeing his ornaments seized him and trampled him to death: the Tripurá soldiers fled; another battle was fought which was gained by the Mugs in consequence of a disagreement between two thousand Patan cavalry. The Mugs marched on to Udipur which they plundered, A. D. 1587, the Rájá fled to the forests of Dum Ghát.* In consequence of these misfortunes, as well as from bad omens and unpleasant dreams, the Rájá resolved to destroy himself, having bathed in "the sacred Mani river," he swallowed a quantity of opium and died, in the course of a day.

He was succeeded by his son Rájadhara Mánik, the Ráṇi his mother performed Sati "decorating her person with all her ornaments and directing Ráma's name to be written on her body." Rájadhar in opposition to the wish of his nobles gave away much land to the Bráhmaṇs stating that in his old age he might not be able to do so; he was an enthusiastic Vishṇuvite, employing eight singers to chaunt the praises of Hari day and night. He did not perform the most trivial action without the order of his head Bráhmaṇ. He erected a temple to Vishṇu and surrounded it with a flower and fruit garden in which he worshipped every day. Adin Tagrul king of Gaur thinking him

* The Mugs are of the same race with the Kukis to whose language the Mug bears a strong affinity. They have at various times exhibited a considerable amount of energy, and at one period they contended with the Burmese for the sovereignty of Asám. They resemble in their career the Mahráttás, but history does not hand down to us any great leaders; being governed in the patriarchal mode by chieftains and divided into clans, they could not bring a centralising power to bear on their conquests.

peaceable, sent troops to plunder the country, but they were repulsed. The Rájá one day absorbed in meditation, while walking on the banks of the river Gumti and drinking the water in which the image of Vishṇu had been washed, fell into the river and was drowned.

Jashadhara Mánik succeeded him, A. D. 1591. Haseyn Sháh king of the Mugs, continued at war with him for twenty-one years, and the Muhammadans by the direction of Jehángir, who wanted horses and elephants, invaded Tripurá; the Moguls proved victorious headed by the Nawab Fatteh Jang, the capital was taken and the Rájá was sent a prisoner to Delhi: he was allowed to go on pilgrimage to Benares, Allahábád, Mathrá, Brindában, and was offered his throne again on condition of paying tribute in horses and elephants, but he declined, saying, his country was too much impoverished by the devastations of the soldiers to allow of being taxed. He died at Brindában of fever in the seventy-second year of his age "while meditating on the excellency of Vishṇu," his body was burnt with costly perfumes.

In the meanwhile the Mogul troops were guilty of great atrocities in Tripurá, plundering the temples and robbing the inhabitants, they even drained the tanks in search of treasure; they continued this course for two years and a half, until a dreadful plague caused them to leave the country.* Kalyán Mánik was raised by the nobles to the throne, in the year 1625; he coined mohurs in Siva's name and his own, he made a tour of his dominions distributing money and land to the Bráhmans whom he held in such reverence that he made them eat before him, he was also kind to the poor and equitable to his subjects. The emperor of Delhi finding he refused to pay tribute directed the Nawáb of Murshidábád to send an army against Tripurá, the troops carried with them a famous cannon made of *leather*, but they were

* It is owing to similar conduct of the Musalmáns as well as the effects of climate that we have so few remains of antiquity in Bengal. No regard was paid to any thing Hindu. In Gaur which is said to have been the capital of Bengal 750 B. C. almost every Hindu monument has disappeared long since, having been either destroyed or used for Muhammadan purposes. The policy of the Muhammadans in Bengal was like that of Edward the Third towards the Scotch,—the destruction of every remnant of a people's nationality and ancient memorials; the Muhammadans made an effort, but a vain one, to extirpate the Bengali language by making the Persian the only one recognised by Government and discountenancing every effort to create a Bengali literature.

defeated. The Rájá then applied himself to devotional objects, he observed the ceremony of *tulá*,* gave presents of horses, elephants, &c. to the Bráhmaṇs and particularly to those who came from Mathrá, Benares, and Orissa, he paid the travelling expenses of those Bráhmaṇs who were desirous of making a pilgrimage. He died A. D. 1659.

We make a passing remark that though Bakhtiyár Khiliji the conqueror of Nadiyá, invaded Asám, he found the people not the feeble race he had met with at Nadiyá, and retired broken-hearted from defeat. It was not until a late period the Musalmáns entered Tripurá led by a desire to obtain elephants which they wanted for military purposes.

A. D. 1659, Gobinda Mánik mounted the Tripurá throne, his wife was a devotee who dug a tank called after her own name, she had also coined mohars in which her own name was on one side, that of the Rájá and Sivá's on the other. The step-brother of the Rájá, having obtained assistance from the Nawáb of Murshidábád attempted to gain possession of the throne; the Rájá being a peaceable man and not wishing to fight with a relative, fled to the king of Árákán, who gave him an hospitable reception, and Chattra Mánik obtained possession of the throne, but he died of small-pox after a reign of seven years.

While Gobind was at Árákán, Sháh Sujá, the son of the emperor Sháh Jehán, came there; having been defeated by his brother and disgusted with the world, he marched through Tripurá to Árákán in order to embark thence for Mecca where he intended to end his days, he was received very kindly by the ex-Rájá of Tripurá who gave him a Nimchá sword as a mark of his gratitude. But the king of Árákán pretending that Sháh Sujá had conspired against his life by sending soldiers in disguise into his palace in *dulis*, in order to assassinate him, resolved to kill him, but being a Buddhist he could not shed blood except in battle, he had him therefore bound and put into a boat on the river, a plank being taken out of the boat it sank with Sujá fast bound in her, the King satisfying his conscience by drowning him, and not shedding his blood; the consort of Sujá plunged a dagger into her bosom rather than submit to the embraces of the Rájá of Árákán; while her daughters poisoned themselves.

* Since Hindus have ceased to be the rulers of India the ceremony of *tulá* to the great pecuniary loss of the Bráhmaṇs has ceased to be observed in India: it consisted in the king's giving his own weight of gold or silver to the Bráhmaṇs.

The usurper having died, Gobinda was again elected to the throne; he sold the sword given him by Sháh Sujá, and devoted the money to objects of utility; he gave presents of salt to all the people of Udipur, cultivated the wastes of Maharkul, and granted land at a reduced rent to the Bráhmans, confirming his donation on copper-plates; he died much regretted, and was succeeded by his son. During his reign intrigues were made with the Nawáb of Murshidábád* to dispossess him of the throne—but in vain.

Ratna Mánik succeeded when only five years old, when he grew up he married one hundred and twenty wives; the heir apparent was guilty of great cruelty, on which account Shaistá Khán, Nawáb of Bengal, took him prisoner and sent him to Delhi.

Narendra Mánik usurped the throne through his influence with the Nawáb of Dacca, but his deceit being found out, the Nawáb deposed him and reinstated the former Rájá; but he did not hold it long, as his brother by intriguing with the Nawáb of Murshidábád gained the throne; his ministers telling him that as two tigers cannot remain in the same jangal, nor one wife with two husbands, so neither could he remain with the old Rájá; he therefore had him strangled, but after that period he never enjoyed peace, being haunted with dreams of some person strangling him in the same way as he had strangled his brother, he gradually wasted away in flesh.

Dharma Mánik succeeded. The Nawáb of Murshidábád having deprived him of a large portion of territory on the plains, locating Mogul zemindars in them, and the Mogul troops at Udipur proving a great annoyance, the Rájá resolved to destroy them: he invited them to dinner and intoxicating them with strong liquor, he had the palace gates shut when all were killed with the exception of a few who climbed the walls and so escaped.

At this time, A. D. 1739, Jagat Ráma, the son of Satra Mánik, who had long lived an exile from his country at Dacca, induced the Nawáb of Dacca to send an army to enforce his claims to the throne of Tripurá, he promising to pay up the arrears of tribute; the Muham-

* This statement of Murshidábád being the capital contradicts the accounts of the historians that until 1704 Jaffier Khán did not remove the seat of government from Dacca to Murshidábád, which received its name from Murshid Kuli Khán. However mention is made of the place in the reign of Akbar.

madan troops however were defeated, but in a second invasion the Rájá fled and Jagat Ráma was made Rájá, a large body of Moslem troops was stationed in Tripurá, its name was changed to Raushanábád, or city of light: as it was an essential part of the Moslem polity wherever they gained an ascendancy to alter the names of persons and places, like the Russians with their Panslavism, they aimed at making the Arabic language as well as religion predominant wherever the Crescent shone. In a similar way the Muhammadans in India made a knowledge of Persian a *sine quá non* as a qualification for office, their great policy was to denationalize the Hindus by discouraging the study of the Sanskrita and Vernacular languages,—but after the operation of this system for six centuries in Bengal, what has been the result? When the glorious measure of Lord W. Bentinck was promulgated, directing the Vernaculars to be the language of the Courts, Persian found few advocates except in interested Amlas and Maulavis who realised their profits by mystifying the people through the veil of a foreign language. Persian as a branch of education is almost extinct in Bengal except in a few Madrassás.

By ingratiating himself with* Jagat Seṭ, the wealthy banker of Murshidábád, the old Rájá regained his throne, and reigned for eighteen years subsequently; he had the Mahábhárat and other old books translated for him. His son succeeded him and refusing to pay tribute he was taken prisoner, but to avoid further indignities he poisoned himself. Jaya Mánik succeeded, but the eldest son of the late Rájá, who had long resided at Murshidábád, through his influence with the Nawáb gained the throne, promising to pay up the arrears of tribute; but he did not remain long on it, an intrigue was formed against him at the Court of Murshidábád, and Indra Mánik was placed on the throne by the Nawáb, an intrigue was formed against

* *Jagat Seṭ*, or the banker of the world, a title he received from the Court of Delhi, was a member of a Jain family, as famous for banking transactions as the Rothschilds; Burke said of them that their transactions were as extensive as the Bank of England. Holding the purse strings they possessed almost unlimited influence at Murshidabad which continued until the Exchequer was removed to Calcutta in 1772. At one period when the Mahráttás plundered Murshidábád Jagat Seṭ lost one crore of Rupees, but the loss seemed to trouble him little, he had so much treasure in store.

him also at the Nawáb's Court, but he went in person to the Nawáb promising to pay the arrears; he obtained a certificate of his proficiency in the Persian language. He died after a reign of four years.

Bijaya Mánik was appointed Rájá by the Nawáb with a salary of 12,000 Rs. monthly, on the stipulation of sending all the revenue to Murshidábád—but falling into arrears he was sent prisoner to the capital, where he died in confinement some time after. Samsher Jang obtained the government and agreed to pay the revenue without any delay, but the people not recognising him as the legitimate heir, he then installed as Rájá, one of the Tripurá family, who resided at Sonárgán, but they still refused; a battle was fought in which Shamsher was victorious; he governed for twelve years with such cruelty and caused such loud complaints to be raised on account of his atrocities that the Nawáb had him seized and blown from the mouth of a gun. Kishen Mánik succeeded. The Dewán of the Nawáb collected all his forces at Chittagan and advanced against the Rájá of Tripurá who was defeated at Kasbá. He soon after died.

After an interregnum of five years in consequence of disputes as to who should succeed, in which the Kukis were called in by one party as combatants, Durgá Mánik, the Jubarája, received from the English government the Khelat as Rájá in 1808; after four years he proceeded with his family on a pilgrimage to Benares, Prayág; while on his way to Gayá he died near Patna and was burned on the banks of the Ganges. His late rival Ráma Gangá was appointed by the English Goverment Rájá according to the Tripurá laws of succession, though several of his rivals disputed his title by force, the Kyphangs aided one party, but the English soon decided the difficulty. The Rájá sent presents to the Governor General, and on the occasion of his installation gave a magnificent feast; he applied himself then to religious duties, having built a temple at Brindában at an expense of 24,000 rupees. He erected a temple to *Siva* at Gangá Ságar, cleared out the tank there, and gave the rent of several villages for supplying the fourteen gods on that island with boiled rice; the Kukis revolted but were subdued, and consented to pay their usual tribute of coins and ivory. In 1822, the people of Haramba submitted to the English Government, having been previously very much oppressed by the Burmese.

In 1765, Tripurá came under British rule, the income of the Rájá then, was about 300,000 rupees. Krishṇa Mánik was made Rájá by the aid of the English, having succeeded to Shamsher Khán noted for his cruelty and tyranny. He performed the ceremony of tulá and gave away large sums of money, particularly to the paṇdits of *Nadiyá,** though he could not be as liberal as before, English collectors being appointed in the country. Krishṇa Mánik died after a reign of twenty-three years, there being no Jubarája, his queen ruled the country for some time, but the people did not submit willingly to her sway; she then petitioned Government who confirmed her request that Rájendra Mánik, her nephew, might succeed, which he did A. D. 1785. Cotton was cultivated in Tripurá in his time, and an invasion of the Mugs was repelled, the revenue collected by the English amounted to 1,39,000 Rupees. The Kukis were also punished severely by the Rájá for an inroad made on the country. Rájendra married the daughter of the Rájá of Manipur; he made an image of eight metals which he placed in the sanctuary of Brindában; he became a great devotee, spending four months in prayer to the gods without speaking to any one, he then abdicated the throne and assumed the habit of a Saṇnyási; he died soon after, having reigned 19 years.

In 1826, the Rájá died, when dying he sent for his spiritual guide and put his *foot on his head,* an *eclipse of the moon* occurred at the same time, which was considered a sure sign that the Rájá would go to heaven; when he became insensible, a sálagrám was placed on his breast. On the occasion of his Śráddha 18,000 Rupees were distributed among the poor, which was collected by *subscription,* as the Rájá's brother was too much in debt to afford it. The late Rájá reigned eleven years, he was accomplished in the Persian language, and also serving and firing a

* The paṇdits of Nadiyá have for several centuries exercised considerable influence in the East of Bengal, and in the district of Asám they made great progress in their proselyting efforts, though it is a popular notion that Hinduism admits of no proselytes, yet various instances could be adduced on the opposite side. The fact that the Asámese language is almost a pure derivation of Sanskrita, though the early conquerors the Ahoms were not a Hindu race, shews the powerful ascendancy that Hindu Institutions must have attained at an early period over them: Bráhmaṇism now is stationary in its proceedings, but in former days it seemed as anxious to vend its spiritual wares as are the Márwári and Mogul merchants to dispose of their articles in trade.

gun quickly; his bones were sent to Brindábana. The Jubarája Kási Chandra was nominated by the English Government his successor, who sent to him a Khelat of honor consisting of the following articles,—a short sleeved jacket, a large dress, turban, a cloth band to encircle the head, gold band for the head.

The Rájá was noted for his dissipated habits and his respect for the Bráhmaṇs; he died in 1829 after a short reign of three years; his Ráṇi on hearing of his death, committed suicide.

The portion of this history, relating to the English period, contains little matters of interest beyond the squabbles between Rájás and Collectors, expensive marriages and feasts given to Bráhmaṇs by zemindars as deeply involved in debt as some of our Chowringhee magnates.

There are a few points omitted in this history which are rather singular—no mention is made of Dacca though it carried on a trade with the Romans, and its muslins were used by the ladies of Rome in the days of the Cæsars. No reference is made to Buddhism, though it was at one period the predominant religion in Bengal, and extended its sway from the Indian Ocean to the frontiers of China: this may be accounted for, perhaps, on the ground that those chronicles were composed by Bráhmaṇs who may have adopted in them their usual policy of taking little notice of their religious opponents, passing over their history in contemptuous silence.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL

FOR OCTOBER, 1850.

The usual monthly general meeting of the Asiatic Society was held in its Rooms, on the 2nd instant, at half-past 8 P. M.

WELBY JACKSON, Esq., Vice-President, in the Chair.

The proceedings of the last meeting were read and confirmed.

Read letters—

1st. From W. Seton Karr, Esq., Under Secretary to the Government of Bengal, forwarding, for the use of the Museum of Economic Geology, a Map of the Cuttack district.

2nd. From Sir H. M. Elliot, Secretary to the Government of India with the Governor General, transmitting, for publication in the Society's Journal, a Statistical Report on the Spiti Valley together with a sketch Map drawn up by Capt. W. E. Hay, Assistant Commissioner in Kulu.

Ordered—that the thanks of the Society be conveyed to the Most Noble the Governor General for the report.

3rd. From Dr. G. Buist, Bombay, enclosing a paper on the general vibration or descent and upheaval, which seems, at a recent geological period, to have occurred all over the northern Hemisphere. Ordered for publication in the Journal.

4th. From W. Seton Karr, Esq., Under Secretary to the Government of Bengal, presenting two copies of a Map of Arabia for the use of the Society's Library.

5th. From Capt. J. C. Hannyngton, Chota Nagpur, forwarding a note to be appended to the Barometrical Tables, lately presented by him to the Society.

6th. From Dr. T. S. Wise, submitting the following extract from a letter of his brother J. P. Wise, Esq. respecting the History of the Tipperah Raj lately forwarded by him for publication in the Bibliotheca Indica.

"The Rájmállá of the Tipperah Family which bears all the marks of antiquity, is kept with the greatest care by Wazier or Rájpandit. He gave me the original MS. for a few days to copy, as a great favour. I was at the time in charge of the Mahárájá's affairs, and I have every reason to believe it to be a genuine record of the Tipperah Family."

Ordered that the letter be brought forward for consideration, on the receipt of the Rev. Mr. Long's report on the original MS.

7th. From E. Blyth, Esq., communicating a short note on the Bird-devouring habits of a species of spider, by Capt. W. S. Sherwill.

8th. From Capt. M. Kittoe, Benares; enclosing a note on an inscription engraved upon a brick found some years ago in a field near a village in the Juanpore district, also a transcript from the original, and a translation by James Ballantyne, Esq. Principal of the Benares College, and suggesting that the second part of the Naishada be printed in the Bibliotheca Indica.

The Secretary stated that the work named by Captain Kittoe, is in the press, and will shortly be published.

9th. Extracts were also read from a private letter of Capt. Kittoe, offering to send down a large collection of Buddhist sculptures from Benares. Referred to the Council.

10th. From B. H. Hodgson, Esq., forwarding Vocabularies from the North Western Frontier and Ceylon in continuation of his series of Vocabularies intended to exhibit the glottological affinities of the whole of the aborigines of India.

11th. From Mr. Blyth, enclosing a continuation of his Conspectus of the Ornithology of India.

12th. From Capt. T. Latter, submitting a work entitled, "Selections from the Vernacular Buddhist Literature of Burmah," and soliciting the Society's patronage to the same. Referred to the Oriental Section.

13th. From R. W. G. Frith, Esq., forwarding a specimen of Nepal paper presented to the Society by C. Chapman, Esq.

14th. From Dr. E. Roer, submitting an extract from a letter of professor Wilson to Dr. Ballantyne, recommending the publication of the text and an English translation of the Anumána Khanda; also the subjoined from a letter of Dr. Albert Weber.

Extract from a letter, from Dr. WEBER, *dated the 25th July,* 1850.

"I have received the fourteen first Nos. of the Bibliotheca Indica and Dr. Hæberlin's Anthology, for which valuable presents, I return my most sincere thanks to the Asiatic Society. I have given a notice of those works in the third number of my Journal, "Vedaic Studies." The Bibliotheca is indeed a splendid undertaking, and we are much indebted for it to the Asiatic Society, and to yourself. Lassen also, in the last number of his Journal, has spoken of it in high terms.

Messrs. Duemmuller and Co. will in about eight days forward to Messrs. Allen and Co. the 20 copies of the two first volumes of the Yajur to which the Asiatic Society has subscribed. Dr. Marwitz rather wishes to receive the amount of the subscription in money, than its value in books, as the subscription has not yet covered the expenses of the edition. Has the Society authorized Allen and Co. to pay the amount of the subscription? If not, you will much oblige me by requesting the Society to give directions to Allen and Co. to that effect. As this time the copies of two volumes will be despatched at once, the sum will amount to £40. The third volume is to appear at the end of February, 1851.

You appear not to have received the first number of my "Vedaic Studies" when you wrote to me (3rd May), *and yet I sent it already on the 7th Aug., last year, to Messrs. Allen and Co.*

Stenzler is zealously employed with an edition of the "Grihyasútras by Aswaláyana, Parasára and Gabhila," and all these labours are preparatory to a complete history of Indian law which he intends publishing. *Hoefer*, of whom a Sanscrit Anthology lately appeared, is to edit Vararuchis Prakrit grammar. *Aufrecht* and *Kuhn* publish a journal for the comparison of the Latin, Greek, German and Sanscrit languages. *Bergstadt* in Upsala has published Sankara's Jnánabodhiní, and will soon edit the Brahmasútras with the commentary of Sankara. *Spiegel* of Erlangen prints here (in Berlin) his Pazend Grammar, and his great edition of the Vendidad Sadi with Pehlvi, Sancrit, Persian and German translation will soon be commenced. An excellent commentary on Hiob (Job) has been published here by Schlottmann. Langlois in Paris has already edited the first four Ashtakas of the Rig in a French superficial translation. A reprint of Wilson's dictionary will, with his permission, be made by Auber and Co."

After some discussion as to the propriety of allowing a synopsis of the proceedings of the Society to be published in the newspapers, it was proposed by Mr. J. R. Colvin, seconded by Capt. Broome, and resolved, that it be left to the discretion of the Council, by direction to the Secretary, to allow an abstract of the Society's proceedings to be published in the newspapers.

The Zoological Curator and Librarian having submitted their usual monthly Reports the meeting adjourned.

Confirmed at a meeting held on the 6th November, 1850.

WELBY JACKSON, *Vice-President.*
FLETCHER HAYES, *Secretary.*

Report of Curator, Zoological Department.

To the Secretary of the Asiatic Society.

SIR,—I have this month to report the presentations of,

1. From Babu Rajendra Mullick, the carcass of a dwarf long-haired goat, from Sikim; and of a young female of the *Ovis Gmelin*, nobis, received from Bussora.

2. From R. W. G. Frith, Esq. a dead Australian Parrakeet *(Melopsittacus undulatus).*

3. From Messrs. Cook and Co. the carcass of a newly born foal, since prepared as a skeleton.

4. From Wm. Theobald, Esq., Junr. a skin of *Manis javanica;* and two specimens in spirit of *Rhenolophus lepidus*, nobis,—the latter from near Colgong. According to Mr. Theobald, only 3 or 4 pairs of this Bat inhabited the large cave in which he captured the pair presented for the Museum.

I have the honor to be, Sir,
Obediently Your's,
E. BLYTH.

Asiatic Society's Rooms, Sept. 30th, 1850.

LIBRARY.

The following books have been added to the Library since the last meeting.

Presented.

Journal of the Archæological Society of Delhi—Sept., 1850. (2 copies.) —BY THE SOCIETY.

Report of the Revenue Administration of the Lower Provinces, for the official year 1848-9.—BY THE GOVERNMENT OF BENGAL.

Maps of the Damudah and Adji Coal Fields in the Zillahs of West Burdwan, Manbhoom and Beerbhoom, in Bengal, with sections of Coal Beds, &c. (2 sets).—By the Same.

Map of Arabia, compiled from all the most recent authorities, by order of the Court of Directors of the East India Company. By John Walker, (2 copies).—By the Same.

Map of the District of Cuttack, surveyed by Lieut. R. Smith, Bengal Artillery.—By the Same.

Journal of the Indian Archipelago, for July and Aug. 1850, (2 copies).—By the Same.

Ditto ditto, for Aug. 1850.—By the Editor.

The Oriental Baptist, No. 46.—By the Editor.

The Calcutta Christian Observer for Oct. 1850.—By the Editors.

The Oriental Christian Spectator.—By the Editor.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of August, 1850.—By the Deputy Surveyor General.

Exchanged.

The Athenæum, Nos. 1186 @ 1190.

For November, 1850.

The Society met on the 6th instant at half past 8 P. M.

Hon'ble Sir James Colvile, President, in the Chair.

The proceedings of the last meeting were read and confirmed.

John Reddie, Esq. was named for ballot at the next meeting; proposed by the President and seconded by Rev. J. Long.

Read letters—

1st. From J. G. Forbes, Esq., officiating Secretary, Bombay Branch of the Royal Asiatic Society, forwarding a copy of the 13th number of the Transactions of that Society.

2nd. From J. Thornton, Esq., Secretary to the Government of the North Western Provinces, announcing that the Hon'ble the Lieutenant Governor has been pleased, in compliance with the request of the Society, to direct Mr. E. A. Reade, Commissioner of the Benares Division, to give such assistance as lies in his power to Capt. Kittoe in his archaiological researches in that district, when the important duties which now occupy his time and talents admit of his attention being diverted.

3rd. From D. W. Mitchell, Esq., Secretary to the Zoological Society of London, communicating the thanks of that institution for the Journal of the Asiatic Society for December, 1847, to July, 1849, presented to it by the Society.

4th. From Capt. George M. Siddons, 1st Light Cavalry, forwarding a translation of the Vichitra Nátaka, a text book of the Sikhs. Referred to the Oriental Section.

5th. From Dr. Seyffarth, Librarian of the German Oriental Society, (Deutsche Morgenlandische Gesellschaft) returning thanks for the following donations, viz. Dr. Hæberlin's Sanskrita Anthology, and Bibliotheca Indica Nos. 1 to 14.

6th. From C. Gubbins, Esq., Agra, communicating a Daily Register of Temperature kept during a part of 1850, at Meerut. Ordered to be published in the Journal.

7th. From Dr. A. Campbell, Darjeling, forwarding a paper on the storms of Tibet, in reply to the queries published in the 3rd number of the Journal.

Ordered—that the best thanks of the Society be conveyed to Dr. Campbell, and the paper be printed in the Journal.

8th. From C. Morehead, Esq., Superintendent, Grant Medical College, presenting copies of the Report of the College for 1845 to 1850.

9th. From Capt. A. Fytche, presenting a slab of stone with a Sanskrit (?) Inscription in the Gupta character, from Arracan.

Capt. Fytche being present at the meeting thanks of the Society for the donation were tendered him in person by the President.

10th. The Council submitted the following report on the Museum of Economic Geology.

Report on the Museum of Economic Geology.

Although this is not the kind of report which I could have desired to present to the Society, inasmuch as it does not give a just idea of what has been done, and omits wholly the important points of the nature of the work, and the hinderances the Museum labours under; being in fact but a brief extract from a much longer report; yet as the Council think it quite sufficient, I have the honour to submit it, in compliance with their wishes.

The question of the "Progress" of the Museum may be considered in so many lights that it must be replied to generally. Its progress then as regards additions to its collections though not equal to what has been obtained in former years is still good, when we consider that, depending upon voluntary contributions, it must always, and necessarily, be very slow in a country like India where so few persons, even if with the knowledge and opportunities required, can afford to collect for us. As regards its arrangements and registry it has been, as from the commencement, kept completely arranged and catalogued, and as regards the different researches carried on, the successful ones and those worth publishing will partly be found in the Society's Journal as it appears,* and in my report when published, and others will be brought forward as soon as *complete*, and if of sufficient importance to occupy space in the Journal.

The following is a list of Collections presented to the Museum of Economic Geology, July, 1849 to July, 1850.

Dr. Spilsbury.
Capt. Sherwill, Cape Specimens.
———— Burra Burra Mines.
———— Deoghur Copper.
———— Beerbhoom ditto.
———— Ditto Coal.

* We have but five numbers for 1849-50, July to July yet published.

Captain Wallage, Labuan Coal, &c.
Captain Brooke, Zinc from Rajpootana.
Messrs. Duncan and Sweetland, Rajmehal Geological Specimens.
Captain Campbell, Bundlecund, ditto ditto.
Mr. Theobald, Junr., Survey (Rocks) from the Burdwan district.
Drs. Campbell and Hobker from Bootan, Geological Specimens.
Mr. Homfray, Ball Coal.
Mr. Theobald, Junr. ditto.
Mr. Torrens, Iron from Beerbhoom.
Rev. Mr. Thomas from Ava, Bezuar Stone.
Lieut. Fell, I. N. from Diamond Island, Coal Lignite and Rocks.

List of Papers for the Journal published and unpublished.

On yellow earth from Sikkim.
— Calderite.
— Ball Coal.
— Ditto ditto.
— Haughtonite.
— Drs. Campbell and Hooker's specimens from Sikkim.
— Catalogue of presentations to the Museum from 1814 to 1850.
A Preliminary Report to government on the Deoghur Copper ores?

H. PIDDINGTON,

Curator, Museum, Economic Geology.

Ordered—that the report be received and laid on the table.

Mr. Piddington, by special permission from the Deputy Governor, as he said, read to the meeting a service letter in which he had communicated to the Government, the discovery of silver ores in the rubbish of the Deoghur copper mines. The ores are known to Peruvian miners under the name of *Pacozi*, and though they contain silver in such appreciable portions that it is only extractable to profit by the curious Spanish process of amalgamation as carried on in those countries, yet they form the staple of the richest Mexican mines from their vast abundance.

Specimens of the ore, and of those from Mexico and Peru, as well as of the silver extracted from Indian specimens were shewn, and Mr. P. added that though the season had prevented his obtaining from Captain Sherwill more than a small additional supply, he had been able to obtain a good average produce from mere surface specimens.

Dr. Roer, Secretary Oriental Section, submitted a letter on the part

of the Section, regarding the publication of translations in the Bibliotheca Indica.

The letter having been read, after some discussion, it was moved by Mr. Mitchell, seconded by Mr. Colvin, and resolved nem. con. that the letter be referred to the Council for consideration and report.

A report was read from the Council, submitting a Draft of a proposed Code of Bye-Laws for the Society: whereupon it was moved by the Hon'ble the President, seconded by Mr. J. R. Colvin and resolved —That the Draft of the proposed Code of Bye-Laws be printed and circulated among the Members, including those resident in the Mofussil, prior to its being finally considered at a Special General meeting to be held on Wednesday the 18th of December.

It was also resolved, proposed by Mr. Welby Jackson and seconded by the president, that Mofussil Members be required to vote *yes* or *no* to each rule. Further that should a Mofussil Member make any suggestion of amendment, the Secretary will bring it to the notice of the meeting, and, in the event of any Member present supporting the suggestion, it can be disposed of as any other motion; if not so supported, the suggestion will not be considered by the meeting.

Confirmed 4th December, 1850.

Signed J. Colvile, *President.*

Fletcher Hayes, *Secretary.*

Library.

The following books have been added to the Library since the last meeting.

Presented.

Transactions of the Bombay Geographical Society; vol. IX. Presented by the Society.

A Catalogue of the Library of the Hon'ble East India Company. London 1845.—By the Hon'ble East India Company.

Transactions of the Zoological Society of London. Vol. III. p. 5.—By the Society.

Journal of the Indian Archipelago, for October 1850.—By the Editor.

The Oriental Christian Spectator for Sept. 1850.—By the Editor.

The Calcutta Christian Observer for Nov. 1850.—By the Editors.

The Oriental Baptist, No. 47.—By the Editor.

The Upadeshaka, No. 47.—By the Editor.

La Patrie, No. 245 for 3rd Sept. 1850.—By the Editor.

Tattwabodhiní Patriká, No. 87.—By the Tattwabodhiní Sabhá.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of Sept., 1850.—By the Deputy Surveyor General.

Proceedings of the Zoological Society of London for 1849.—By the Society.

The Citizen, for Sept. and Oct. 1850.—By the Editor.

Exchanged.

Calcutta Review No. 27.

Purchased.

Journal des Savants for July, 1850.

Comptes Rendus for July, 1850.

Annals and Magazine of Natural History for Aug. and Sept. 1850.

Cyclic Tables of Hindu and Mohammadan Chronology. By C. P. Brown.

North British Review No. 26.

Edinburgh Review No. 185.

Museum of Antiquities.

From Capt. A. Fytche. A large stone with a Sanskrita (?) Inscription from Arracan.

For December, 1850.

The usual monthly General Meeting was held on the evening of the 4th instant, at half-past 8. P. M.

Hon'ble Sir James Colvile, Kt. President, in the chair.

The proceedings of the last meeting having been read, a verbal alteration in the minutes was suggested and agreed to, and the proceedings were confirmed.

J. Reddie, Esq., duly proposed and seconded at the November meeting was balloted for, and elected an ordinary member.

Hon'ble J. C. Erskine, Resident at Nepal, was named as a candidate for election at the next meeting; proposed by B. H. Hodgson, Esq. and seconded by the President.

Read letters—

—From Baron Von Hammer Purgstall, presenting a copy of the "Vienna Review" and some of his academical speeches, for the Society's Library, and stating that he has not received the Journal for January and March 1849.

This communication gave rise to a protracted conversation as to the steps to be taken to accelerate the circulation of the Society's publications in Europe. It was ultimately proposed by Mr. R. Houston seconded by the President, and resolved—that Professor Wilson be requested to aid the Asiatic Society with his advice and co-operation in this matter. The best thanks of the Society were also voted to the Baron Von Hammer Purgstall, and the Nos. of the Journal wanted were ordered to be forwarded to him.

—From R. Clarke, Esq., Honorary Secretary to the Royal Asiatic Society, London, conveying the thanks of that Institution for the following donations to its Library, viz. "Bibliotheca Indica," Nos. 1—14, and Hæberlin's Anthology.

—From E. Clibborn, Esq., Acting Secretary to the Royal Irish Academy, tendering thanks for the donation of the Journal of the Asiatic Society Nos. 166 to 202, and enquiring if the earlier volumes of the work could not be procured for the Academy.

Ordered that the Secretary write to Mr. Clibborn for a memorandum of the volumes required.

—From N. Shaw, Esq., Secretary to the Royal Geographical Society of London, acknowledging receipt of the Journal, Nos. 204—5.

—From Mons. E. Mulsant, Secretary to the Société National d'Agriculture, Histoire Naturelle, et Arts Utiles de Lyon, presenting a copy of the XI. volume of the Society's Transactions.

—From the Editor of the *Hindu Intelligencer* newspaper, requesting that a copy of the Journal as it appears monthly, may be presented to him gratis, as at present furnished to the Editors of the daily papers in Calcutta.

Ordered—that the Society do not think it desirable to extend the privilege in question to the Editors of Weekly papers.

A paper was read from B. H. Hodgson, Esq., descriptive of the horns of a Tibetan Stag, supposed to be identical with Cervus Affinis, Hodg. Ordered for publication in the Journal.

Some questions being asked about the Draft Code of Rules to be discussed at the special general meeting on the 18th instant, the President explained that it is desirable to afford time to the members at distant stations to express their sentiments on the subject, and accordingly moved that the special general meeting for the consideration of the Draft Code of Rules be postponed to 15th January, 1851. Mr. H. Torrens seconded the motion, when it was put to the vote and carried nem. con.

A list of donations to the Library having been laid on the table the Meeting adjourned.

Confirmed 8th January, 1851.

J. Colvile, *President.*
F. Hayes, *Secretary.*

Library.

The following books have been added to the library since the last meeting.

Presented.

Annales des Sciences Physiques et Naturelles, d'Agriculture et d'Industrie, publiees par la Société national d'Agriculture, etc. de Lyon. Tome XI. —Presented by the Society.

Rgya-char-rolpa, ou Development des Jeaux, contenant l'Histoire du Buddha Sakya Muni, Traduit sur la version Tibetaine par P. E. Faucaux. Paris, 1848, 4to.—By the Translator.

Chrestomathie Hindie et Hindouie, Paris, 1850, 4to.—By Mons. Garcin de Tassy.

Zakarija ben Mohammad ben Mahmud el Cazwini's Kosmographie. Erster Thiel. Die كتاب عجايب المخلوقات Wunder der Schopfung. Herausgegeben von F. Wustenfeld. Zeweites Helft. Gottingen, 1849.—By the Editor.

Vergliechende Grammatik des Sanskrita, Zend, Griechischen, Lateinischen, Litthauischen, Altslawischen, Gothischen und Deutschen, von Franz Bopp. Funfte Abtheilung. Berlin, 1849.—By the Author.

Zeitschrift der Deutschen Morgenlandischen Gesellschaft, Vol. III. p. IV. and Vols. IV. p. I.-II.

Annual Report of the Grant Medical College, Bombay, for the years 1845 @ 50,—3 Nos.—By the College.

Jáska's Nirukta summt den Nighantavas herausgegeben von Rudolph Roth. 2 parts, Gottingen, 1848, 8vo.—By the Editor.

Rapport Annual fait a la Société Asiatique dans la Seance Generale du 30 Juille, 1849. Par M. Jules Mohl.—By the Author.

Transactions of the Royal Society of Edinburgh, Vol. XVI. part V.—By the Society.

Proceedings of the Royal Society of Edinburgh, Nos. 33-4.—By the same.

Transactions of the Royal Irish Academy, Vol. XXII. parts I.-II.—By the Academy.

Transactions of the Royal Society of London for the year 1849, p. II.—By the Society.

Discussion of Meteorological Observations taken in India at various heights, embracing those at Dodabetta on the Neelgherry Mountains at 8640 feet above the level of the sea, by Lieut.-Col. W. H. Sykes. (From the Philosophical Transactions, Part II. for 1850).—By the Author.

List of Fellows of the Royal Society of London, 1849.—By the Royal Society.

Address of the Right Honorable the Earl of Rosse, the President, read at the Anniversary Meeting of the Royal Society, on Friday, November 30th, 1849.—By the same.

Observations in Magnetism and Meteorology made at Markestoun in Scotland, in 1845-6. Edited by John Allan Bonn, Esq. Edinburgh, 1849, 4to.—By the Royal Society of Edinburgh.

Catalogue of 2156 Stars formed from the observations made during twelve years from 1836 to 1847, at the Royal Observatory, Greenwich. London, 1849, 4to.—By the Royal Society.

Bulletin de la Société de Geographie, Troisieme Serie, Tome XI. Paris, 1849.—By the Society.

Report of the British Association for the Advancement of Science, for 1849.—By the Association.

Journal of the Royal Asiatic Society, Vol. XII, Part II.—By the Society.

Proceedings of the Royal Irish Academy for the year 1847-8, Vol. IV. Parts I.-II.—By the Academy.

Indische Studien, Zeitschrift fur die Kunde des indischen Alterthums. Im Vereine mit mehreren Gelehrten herausgegeben von Dr. Albrecht Weber, Erster Heft. Berlin, 1849.—By the Editor.

A Catalogue of the Library of the East India College, 1843. Hertford, 1843, 8vo.—By the Government of Bengal.

A Geographical Description of the Panjab, in Panjabi. Translated from the Persian of Bûte Shâh, by Munshi-Bahlol. Lodiana, 1850, 8vo.—By Sir Henry Elliot.

Journal of the Bombay Branch of the Royal Asiatic Society, No. XIII. —By the Society.

Journal of the Royal Geographical Society of London, Vol. XIX. Part II. —By the Society.

Jahrbucher der Literatur for 1848.—By Baron Von Hammer Purgstall.

Abhandlung über die Siegel der Avalier Perser und Türken. Von Freiherrn Von Hammer Purgstall.—By the same.

Bericht über Hrn. Reinaud's franzosische Uebersetzung von Abulfeda's Geographie. Von Freiherrn Von Hammer Purgstall.—By the same.

Von der Inschriftverbrämung der Kleider als Sauverainitatsrecht der Frauen im Morgenlande. Von Freiherrn Von Hammer Purgstall.—By the same.

Ueber die Menschenclasse, welche von den Arabern "Schoubige" genannt wird. Von Freiherrn Von Hammer Purgstall.—By the same.

Bericht über Herrn Charrieres Negociations de la France dans le Levant. —By the same.

Bericht über die in den letsten vier Jahren 1845-6-7 und 48 zu Constantinopel gedruckten und lithographirten werke. Von Freiherrn Hammer Purgstall, (3 parts.)—By the same.

Proceedings of the Zoological Society of London for 1848.—By the Society.

Meteorological Register kept at the Surveyor General's office, Calcutta, for the month of October, 1850.—By the Deputy Surveyor General.

Quarterly Journal of the Geographical Society, Nos. 20, 21, 22.—By the Society.

Journal Asiatique, Nos. 65 and 72. By the Asiatic Society of Paris.

Tattwabodhini Patriká, No. 88.—By the Tattwabodhini Sabha'.

Journal of the Indian Archipelago, Vol. IV. Part X.—By the Editor.

Two copies of the same.—By the Government of Bengal.

Oriental Christian Spectator for Oct. 1850.—By the Editor.

Catalogue of Books for sale at the British Library.—By Messrs. R. C. Lepage and Co.

Purchased.

Lexicon Bibliographicum et Encyclopædicum, a Mustafah ben Abdullah, Katib Jelebi dicto et nomine Háji Khalfa celebrato compositum, Vol. V. Edited by Gustavas Fluegel. London, 1850—4to.

Exchanged.

Jâmeson's Journal, Nos. 94—7.

Philosophical Magazine, Nos. 235 @ 247.

Athenæum, Nos. 1191 @ 1193.

[*Meteorological Register, continued.*]

Observations made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.			Max. Therm. in sun's rays.	Rain Gauges.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.		Feet. 4. Upper.	Feet. 4. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.975	77.7	77.3	66.5	N.	Clear	29.970	77.3	76.5	65.3	N.	Clear	29.978	75.0	74.5	68.0	N.	Clear	79.5	69.1	58.7	..	..	..		1
.959	78.5	78.0	67.2	N. W.	Ditto	.950	78.0	76.9	67.0	W.	Ditto	.962	75.2	74.0	62.5	W.	Ditto	79.3	70.2	61.0	..	..	..		2
.967	79.4	78.7	69.0	N.	Ditto	.906	79.0	77.3	67.7	N.	Ditto	.936	74.2	73.5	58.0	N.	Scatd. clouds	80.3	70.4	60.5	..	..	..		3
.961	81.0	80.0	69.9	N.	Ditto	.961	78.4	77.8	68.2	N.	Scatter'd clouds	.982	76.8	76.3	68.0	N.	Cloudy	80.3	70.4	60.5	..	..	..	●	4
.997	80.0	97.2	67.3	W.	Scatter'd clouds	30.007	72.2	73.2	69.9	W.	Cumuli	30.000	76.7	76.0	68.5	N.	Cirro-strati	81.5	73.3	65.0	..	..	..		5
30.012	80.5	79.5	64.5	N.	Clear	.003	79.5	78.6	63.2	N.	Clear	.019	76.0	75.0	62.7	N.	Clear	81.3	69.7	58.0	..	..	..		6
.000	79.2	79.0	68.5	W.	Ditto	29.990	78.0	77.8	65.9	N. W.	Ditto	.002	74.2	72.7	66.5	N. W.	Scatd. clouds	79.8	69.2	58.5	..	..	..		7
29.937	79.5	78.9	66.5	NNW	Ditto	9.54	78.2	77.0	65.2	NNW	Ditto	29.970	75.2	78.8	65.9	N. W.	Clear	80.5	70.0	59.5	..	..	..		8
30.073	79.5	79.0	66.2	N. W.	Ditto	30.061	79.5	77.9	65.3	N. W.	Ditto	30.071	76.0	74.0	66.3	N. W.	Ditto	80.4	70.1	59.7	..	..	..		9
29.925	82.8	80.2	64.5	S. W.	Ditto	29.947	80.4	79.0	65.7	W.	Ditto	29.956	77.0	74.5	67.0	W.	Ditto	81.3	70.4	59.5	..	..	..		10
.906	84.6	83.2	69.7	S. W.	Ditto	.905	83.5	82.5	69.2	S. W.	Ditto	.917	80.0	79.3	71.0	S. W.	Ditto	84.4	73.2	62.0	..	..	..		11
[illegible]	79.0	78.0	66.5	N. W.	Cumuli	.877	78.5	77.2	64.0	N. W.	Ditto	.893	76.3	74.8	65.0	N.	Scatd. clouds	79.5	72.0	64.5	..	..	..	☽	12
[illegible]	77.0	76.5	60.5	N. W.	Clear	.966	76.5	74.5	59.0	N. W.	Ditto	.984	72.5	70.4	60.4	W.	Clear	79.0	67.9	56.7	..	..	..		13
[illegible]	74.2	73.5	58.3	W.	Ditto	.994	73.6	72.0	57.2	N. W.	Ditto	30.031	68.5	67.2	57.5	N.	Ditto	74.7	64.9	55.0	..	..	..		14
30.023	76.0	75.3	63.0	N.	Ditto	30.012	76.3	74.5	62.5	N.	Ditto	.030	72.5	71.3	63.0	N.	Ditto	76.5	66.0	55.5	..	..	..		15
.018	76.5	75.8	63.5	W.	Ditto	.005	76.0	74.5	63.0	N. W.	Ditto	.022	72.5	69.5	63.0	N.	Ditto	76.0	65.5	55.0	..	..	..		16
.009	75.5	73.8	61.5	N. W.	Ditto	.009	75.5	74.0	62.0	N.	Ditto	0.19	72.0	70.5	62.0	N.	Ditto	76.3	66.2	56.0	..	..	..		17
.025	77.6	76.0	64.2	N.	Ditto	.021	77.5	76.0	65.0	N.	Ditto	.032	74.2	72.5	63.8	NNW	Ditto	78.3	67.2	56.0	..	..	..	⊙	18
.033	79.5	79.0	67.6	S. W.	Ditto	.031	79.5	78.2	68.1	N. W.	Ditto	.042	76.8	75.3	67.9	W.	Ditto	80.5	69.8	59.0	..	..	..		19
.035	80.2	78.8	68.4	W.	Ditto	.036	78.1	76.6	68.1	N. W.	Ditto	.050	74.8	73.8	67.4	N. W.	Ditto	81.0	72.0	63.0	..	..	..		20
.048	78.0	77.2	63.7	NNW	Ditto	.038	77.2	76.0	62.9	NNW	Ditto	.052	73.9	72.7	62.6	N.NE	Ditto	78.2	69.0	59.8	..	..	..		21
.033	78.5	77.7	65.0	NNW	Cirro-strati	.026	78.0	76.3	65.5	N. W.	Cirro-strati	.036	74.7	73.0	66.0	N.	Cirro-strati	79.0	68.5	58.0	..	..	..		22
.011	80.0	79.2	64.0	NNW	Ditto	.010	79.4	78.0	62.6	NNW	Clear	.013	75.5	74.0	62.7	N.	Clear	80.3	70.5	60.6	..	..	..		23
.002	78.0	77.0	62.4	NNW	Clear	.003	77.4	76.0	62.0	N. W.	Ditto	.012	73.8	72.0	62.2	N.	Ditto	78.3	68.8	59.3	..	..	..		24
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	..		25
.080	76.6	76.0	62.6	N. W.	Cirro-strati	.073	76.2	74.2	61.4	N. W.	Cirro-cumuli	.087	72.1	70.6	62.2	N. W.	Cirro-strati	77.8	67.1	56.3	..	..	..	☾	26
.049	75.6	74.6	61.3	NNW	Clear	.043	74.5	73.0	60.8	N. W.	Clear	.060	71.2	70.0	60.8	N.	Clear	76.3	66.4	56.4	..	..	..		27
.085	76.0	74.2	62.4	N. W.	Cumuli	.079	76.0	74.0	62.4	N.	Ditto	.090	72.5	71.0	62.2	N.	Ditto	76.3	65.8	55.3	..	..	..		28
.086	77.3	76.4	62.3	N.	Clear	.074	76.7	75.0	61.6	N.	Ditto	.079	73.0	72.0	81.6	N.	Ditto	77.8	67.3	56.7	..	..	..		29
.048	77.3	76.0	63.9	NNW	Ditto	.024	76.9	75.3	63.5	N.NE	Ditto	.029	73.4	71.8	63.4	N. E.	Ditto	78.3	67.3	56.3	..	..	..		30
29.972	77.2	77.2	64.0	W.	Ditto	29.952	77.8	76.3	63.6	W.	Ditto	29.958	73.4	71.3	64.0	N. W.	Ditto	78.6	67.8	57.0	..		..		31
30.001	78.4	77.5	64.8	....	.....	29.998	77.5	76.2	64.3	....	.....	30.010	74.3	73.1	64.4	....	.....	79.0	68.9	58.6	..	..	..		

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of December, 1850.

Date.	Observations made at Sun-rise.						Observations made at apparent noon.						Maximum Pressure observed at 9h. 50m.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1S	30.067	60.4	61.0	58.0	N. W.	Clear	30.099	71.6	72.0	63.7	N. W.	Clear	30.050	76.4	76.5	66.5	N.	Clear
2	.023	62.0	62.5	60.5	W.	Ditto	.078	69.6	70.0	64.5	N.	Cloudy	.018	76.6	75.8	66.0	N. W.	Cloudy
3	29.982	62.5	63.0	61.0	W.	Ditto	.038	71.0	71.7	65.9	N.	Clear	29.972	77.3	77.0	70.0	N.	Clear
4	30.005	64.7	65.5	64.0	N.	Cloudy	.077	72.0	72.5	67.3	N.	Cloudy	30.019	79.3	78.9	69.0	N.	Ditto
5	29.995	67.0	68.5	66.0	S. W.	Ditto	.114	75.0	75.3	68.5	N.	Clear	.065	79.9	79.6	68.8	W.	Cirri
6	30.068	60.0	60.3	59.0	N.	Cumuli	.133	71.2	72.0	66.0	N.	Cumuli	.071	78.2	77.2	63.8	N. N.W.	Clear
7	.065	59.7	60.5	59.0	N.	Clear	.124	69.9	70.5	61.2	N.	Clear	.061	77.0	76.3	65.0	N. W.	Ditto
8S	.034	61.0	61.4	59.0	N. W.	Ditto	.093	72.7	74.0	62.2	N. N.W.	Ditto	.026	77.7	76.7	66.9	N.	Ditto
9	.023	61.4	62.5	60.7	W.	Ditto	.090	71.0	71.9	65.0	N. W.	Ditto	.055	73.0	77.2	66.7	N. W.	Ditto
10	.104	61.0	61.3	60.0	N.N.W.	Ditto	.067	73.0	71.8	66.3	S. W.	Ditto	.021	78.5	78.0	66.8	S. W.	Ditto
11	.005	64.5	65.5	65.0	S. E.	Foggy	.058	73.5	74.2	70.0	S.	Ditto	29.989	80.8	81.0	70.5	S. W.	Ditto
[illegible]	29.992	66.5	67.0	65.0	N.	Cumuli	29.983	71.8	72.2	67.8	N.	Cumuli	.942	75.0	74.2	67.0	W.	Cumuli
[illegible]	30.013	58.7	59.0	53.7	N.	Clear	30.086	69.8	70.5	58.4	N.	Clear	30.044	75.2	74.5	59.2	N.	Clear
[illegible]	.036	56.5	57.5	53.0	N. E.	Ditto	.094	66.3	67.0	57.8	N.	Ditto	.055	73.0	71.7	59.0	N.	Ditto
15S	.084	56.7	57.5	54.5	N.	Ditto	.145	70.2	70.5	63.0	N.	Ditto	.088	74.0	73.7	63.8	N.	Ditto
16	.078	56.4	57.0	56.3	N.	Ditto	.131	67.2	68.2	62.4	N.	Ditto	.082	75.2	74.5	63.7	W.	Ditto
17	.067	57.5	58.0	56.0	N.	Ditto	.123	67.0	69.3	61.8	N.	Ditto	.078	74.0	73.1	62.7	W.	Ditto
18	.075	57.5	57.8	56.4	N.	Ditto	.134	70.0	70.0	63.7	E.	Ditto	.083	75.8	74.6	64.4	N. N.W.	Ditto
19	.091	58.2	58.8	58.0	N. E.	Ditto	.142	71.3	72.2	65.2	E. S. E.	Ditto	.098	77.3	76.8	67.0	S. W.	Ditto
20	.097	63.0	63.8	63.0	N. E.	Cloudy	.159	73.2	73.2	69.9	S. W.	Cumulo-strati	.112	78.0	77.8	69.6	S. W.	Ditto
21	.082	59.4	60.0	58.5	N.	Clear	.146	68.3	69.4	65.2	N.	Cirro-strati	.098	76.6	75.6	63.4	N. W.	Ditto
22S	.095	57.5	57.8	57.0	N. W.	Ditto	.143	69.2	70.6	64.0	N. E.	Clear	.090	77.0	76.3	64.6	N. W.	Cirro-strati
23	.076	60.0	60.5	59.4	N.	Cirro-strati	.138	71.0	72.2	66.1	N. W.	Cirro-strati	.086	78.0	77.8	66.7	W. S.W.	Ditto
24	.071	58.9	59.3	58.4	N.	Clear	.137	68.5	69.0	63.3	N. N.W.	Clear	.087	76.4	75.8	63.7	N. N.W.	Clear
25	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
26	.129	56.0	57.0	54.7	N.	Cirro-strati	.196	67.6	68.9	59.0	E. S. E.	Cirro-strati	.139	75.2	74.0	61.3	S.	Cirro-strati
27	.123	55.8	56.0	55.2	N. N. E.	Foggy	.183	66.8	68.3	60.6	N. N.W.	Clear	.120	74.7	73.8	62.3	W. S.W.	Cumuli
28	.148	55.0	55.0	54.0	N.	Clear	.219	65.2	66.7	60.4	N. N.W.	Ditto	.152	74.2	72.2	62.4	N.N.W.	Ditto
29S	.152	56.5	56.6	55.4	N.N. W.	Ditto	.220	68.0	70.0	61.7	N. N. E.	Ditto	.153	75.8	74.2	61.3	N.	Clear
30	.141	56.0	56.4	55.0	N.	Ditto	.191	67.0	68.5	62.0	N.	Ditto	.127	75.6	74.7	64.0	N.	Ditto
31	.070	57.0	58.3	57.0	N.	Ditto	.125	66.2	68.2	61.3	N. W.	Ditto	.050	74.7	74.6	64.5	W.	Ditto
Mean	30.066	59.5	60.2	58.4	....	.....	30.122	69.4	70.7	63.5	....	.....	30.068	76.3	75.8	65.0	....	.....

[*Meteorological Register, continued.*]

Observation made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.			
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. Upper. 4.	Feet. Lower. 4.	Moon's Phases	Date.
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.811	87.3	87.0	71.8	S. W.	Clear	29.806	86.6	85.5	71.8	S. W.	Clear	29.809	83.4	82.2	73.3	S. W.	Clear	89.0	80.0	71.0	..	..	..		1
.815	89 2	88.2	75.2	W.N.W.	Ditto	.807	88.4	87.0	75.5	W.	Ditto	.817	85.8	84.0	74.7	W.N.W	Ditto	90.8	81.9	73.0	..	..	..		2
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	..		3
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	..	●	4
.863	85.8	84.7	70.2	N. W.	Clear	.864	84.5	82.9	68.9	N. W.	Clear	.877	81.2	80.0	69.9	N. W.	Clear	87.2	78.6	70.0	..	..	..		5
.869	86.9	85 4	71.9	E.	Cumulo-strati	.874	84.9	82.9	71.3	N. E.	Cumulo-strati	.888	81.8	80.6	71.9	N.	Scatd. clouds	87.0	78.5	70.0	..	..	..		6
.903	85.4	84.8	73.3	N.	Cumuli	.902	84.5	84.0	73.7	N.NE	Scatter'd clouds	.918	82.8	82.9	74.3	N.NE	Cloudy	87.2	80.3	73.4	..	..	..		7
.949	79 4	79.1	74.4	N. E.	Cloudy	.941	77.5	77.0	73.7	NNW	Cloudy	.949	76.7	76.6	73.6	N. W.	Ditto	81.5	73.7	75.9	..	..	..		8
.853	81.7	80.5	75.3	N. W.	Ditto	.854	79.3	79.5	74 6	NNW	Ditto	.865	78.7	79.0	74.6	NNW	Ditto	81.8	77.9	74.0	..	..	..		9
.850	79.0	78.9	74.0	N.	Ditto	.840	78.0	77.2	72.3	NNW	Ditto	.851	76.0	76.3	72.7	N.	Ditto	80.0	77.4	74.7	..	..			10
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	1.77		11
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..		☽	12
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	..		13
..	..	.	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	..		14
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	..		15
.904	83.0	81.8	70.3	N. W.	Clear	.902	82.8	81.3	70.4	NNW	Cumuli	.930	75.0	74.3	70.2	NNW	Cirro-strati	84.8	..	..	110.0	..	..		16
.904	83.0	82.2	69.7	NNW	Cumuli	.902	82.0	80 3	69.0	N. W.	Clear	.908	78.3	77.0	69.0	NNW	Clear	84.6	76.2	67.8	108.5	..	..		17
.850	82.8	82.0	69.9	W.N.W	Clear	.852	81.9	80.5	68.3	W.	Ditto	.862	77.8	76.4	68.9	W.N.W	Ditto	84.3	75.0	65.7	110.2	..	..		18
.791	82 4	82.1	70.3	N. W.	Ditto	.782	81.6	80.2	69.0	NNW	Ditto	.790	78.9	77.8	68.6	NNW	Ditto	83.5	74.9	66.2	107.5	..	..	⊙	19
.845	81.2	81.0	66.3	W.	Ditto	.843	80.3	79.2	65.0	W.	Ditto	.858	77.2	75.8	65.5	W.	Ditto	82.3	73.5	64.7	102.0	..	..		20
.954	83.0	82.2	66 2	W.	Ditto	.948	82 2	80.2	65.0	W.N.W	Ditto	.964	78.0	75.2	68.0	NNW	Ditto	84.4	73.2	62.1	105.3	..	..		21
.987	83 4	82.6	66.5	N. W.	Ditto	.982	81.8	80.3	65.0	N. W.	Ditto	.991	77.6	76.0	66.3	N. W.	Ditto	84.9	74.5	64.0	105.8	..	..		22
.970	79.4	78.6	66.9	NNW	Ditto	.970	78.8	77.5	66.4	NNW	Ditto	.987	76.0	75.0	66.8	NNW	Ditto	80.6	71.8	63.0	..	..	..		23
.983	80.8	79.7	67.8	N. W.	Ditto	.977	80.0	78.4	66.3	NNW	Ditto	.980	78.0	76.4	66.4	NNW	Ditto	81.9	73.0	64.0	..	..	..		24
.996	80.5	79.2	67.0	NNW	Ditto	.978	79.0	78.0	66.8	N.	Ditto	.989	75.5	74.5	66.5	....	.....	81.0	70.8	60.5	..	..	..		25
.967	80.0	79.0	66.0	NNW	Cirro-strati	.970	79.0	77.2	64.4	NNW	Ditto	.977	75.5	73.7	64.8	NNW	Cirro-strati	81.0	71.5	62.0	..	..	..	☾	26
.982	79 2	79.5	66.0	N.	.....	29.978	78.8	77.4	66.2	N. W.	Cirro-strati	.999	75.5	74.2	66.8	N. W.	Ditto	80.5	69.8	59.0	..	..	..		27
30.013	79 8	78.0	65.7	N.	Scatter'd clouds	30.006	78 9	78.0	65.1	N.	Clear	30.028	76.6	75.5	65.0	N.	Ditto	80.2	75.1	61.0	..	..	..		28
.020	78.9	78.2	63.0	N.	Clear	.018	77.9	76.7	65.5	N. W.	Ditto	.032	73.6	72.0	60.0	N.	Ditto	78.0	70.0	62.0	..	..	..		29
29.987	78.3	77.8	64.2	N.	Ditto	29.982	77.8	76.3	64.0	N. W.	Ditto	.002	75.0	75.5	65.3	N. W.	Ditto	79.5	69.0	58.5	..	..	..		30
29.915	82.2	81.4	69.2	....	.....	29 912	81.1	79.9	69.1	....	.....	29.926	78.0	76.9	68.8	....	.....	83.3	74.8	66.5	107.0	..	17.6		

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of November, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.910	70.8	71.5	68.8	N. W.	Cirro-strati	29.934	82.8	83.0	72.0	S. W.	Cirro-strati	29.885	86.3	85.8	72.0	W.	Clear
2	.913	73.0	73.5	72.3	S. W.	Clear	.947	84.1	84.5	77.4	S. W.	Clear	.886	88.0	87.0	77.3	W.	Ditto
3S	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
4	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
5	..	..	..	..	....	.....	.967	80.2	81.0	73.0	N. W.	Clear	.912	85.0	83.8	69.4	W.	Clear
6	.945	69.2	70.3	68.0	N.	Clear	.938	81.3	82.0	71.4	E.	Ditto	.928	85.0	84.9	73.0	N. E.	Cumulo-strati
7	.957	73.2	73.5	70.6	N.	Cirro-strati	30.004	81.6	82.0	75.0	N.	Cirro-cumuli	.957	86.2	85.0	74.8	N.	Cumuli
8	.959	76.0	76.3	73.8	N. N. E.	Cloudy	.006	77.7	78.0	74.4	N. N. E.	Cloudy	.975	81.0	80.3	74.2	N. E.	Cloudy
9	.934	74.0	74.3	72.6	N. W.	Ditto	29.977	76.3	76.7	73.6	N. W.	Ditto	.901	80.9	80.5	75.0	N.	Ditto
10S	.878	75.0	75.3	72.0	N. E.	Ditto	.919	76.7	76.8	72.3	N. E.	Ditto	.876	78.2	78.0	72.8	N.	Ditto
11	..	..	..	..	....	.....	.798	78.0	78.8	73.3	N. E.	Ditto	.752	77.2	77.3	73.4	N.	Ditto
12	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
13	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
14	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
15	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
16	..	..	..	..	....	.....	30.004	78.0	78.0	73.0	N. W.	Clear	.962	81.9	81.0	70.6	N. W.	Cumuli
17S	.970	68.0	68.7	67.0	N. W.	Cirro-cumuli	.004	78.3	78.0	70.0	N. N. W.	Cirro-cumuli	.968	82.0	81.5	69.8	N. W.	Ditto
18	.946	65.5	66.0	65.0	N.	Clear	29.971	76.0	76.3	69.5	W. N. W.	Clear	.930	81.3	81.5	72.1	N. W.	Ditto
19	.887	65.7	65.9	63.9	N. W.	Ditto	.915	75.9	75.6	69.2	N. W.	Ditto	.961	81.2	80.3	71.8	N. W.	Ditto
20	.874	64.0	64.3	61.0	N. W.	Ditto	.938	75.0	75.5	66.2	W.	Ditto	.900	79.0	79.2	67.0	W.	Clear
21	30.009	61.9	62.8	60.0	W. N. W.	Ditto	30.063	76.0	76.6	67.2	W. N. W.	Ditto	30.012	82.0	81.7	66.7	W. N. W.	Ditto
22	.056	63.4	64.3	62.2	W. N. W.	Ditto	.110	76.0	76.4	66.2	N. N. W.	Ditto	.052	82.2	81.8	65.6	N. W.	Ditto
23	.027	62.7	63.0	60.8	N. N. W.	Ditto	.087	72.0	66.8	65.0	N. N. W.	Ditto	.032	77.8	77.0	66.1	N. N. W.	Ditto
24S	.067	63.7	64.0	62.8	N. N. W.	Ditto	.088	75.3	75.0	66.7	N.	Ditto	.050	78.7	77.4	67.2	N. N. W.	Ditto
25	.063	63.3	64.3	62.7	....	.....	.109	74.5	74.8	66.9	N.	Ditto	.072	78.1	77.5	65.4	N. N. W.	Ditto
26	.053	62.0	63.0	61.0	....	.....	.096	73.6	74.0	66.0	N. N. W.	Ditto	.045	78.5	77.5	65.8	N.	Ditto
27	.020	60.2	61.3	60.0	N. W.	Cirro-strati	.085	73.0	73.8	66.7	N.	Ditto	.036	78.2	77.8	66.2	N. N. W.	Ditto
28	.073	62.0	62.7	61.5	N.	Ditto	.115	73.0	73.6	65.4	N.	Cirro-strati	.082	73.2	73.0	65.5	N.	Cirro-strati
29	.078	63.8	64.5	60.7	N.	Ditto	.144	72.3	73.0	62.5	N.	Clear	.086	76.4	76.0	62.0	N.	Clear
30	.068	60.0	61.0	56 5	N.	Ditto	.124	69.2	70.0	60.0	N. N. W.	Ditto	.049	75.5	76.0	63.5	N.	Ditto
Mean	29.985	66.5	67.2	65.0	....	.....	30.015	76.5	76.7	69.3	....	.....	29.967	80.6	80.1	69.5	....	.....

[*Meteorological Register, continued.*]

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.			Max. Therm. in sun's rays.	Rain Gauges.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.		Feet. 4. Upper.	Feet. 4. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.908	90.0	89.5	82.0	S. W.	Cirro-cumuli																				1
																									2
																									3
																									4
																									5
																									6
																									7
																									8
																									9
																									10
..	..	..	..	..	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	1.77		11
																									12
																								D	13
																									14
																									15
																									16
																									17
																									18
																									19
																									20
..	..	..	..	..	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	0.14	⊙	21
29.942	84.4	83.4	77.0	N. E.	Cloudy	29.926	82.8	82.3	77.3	N. E.	Cloudy	29.937	80.3	80.0	76.0	N. E.	Scatd. clouds	86.0	..	..	..	..	..		22
.901	86.0	85.0	78.3	N. W.	Cumulo-strati	.895	86.2	85.3	78.4	N.	Cumulo-strati	.903	84.0	83.0	78.3	W.N.W	Cumulo-strati	89.8	82.8	75.8	106.0	..	..		23
.837	88.6	88.0	78.3	S. W.	Ditto	.831	89.0	87.7	77.6	W.	Cirro-cumuli	.850	85.2	83.9	79.3	S. W.	Ditto	89.8	83.5	77.2	107.4	..	..		24
.841	87.1	83.9	78.4	S.S.E.	Ditto	.853	80.0	78.9	75.0	S.	Cloudy	.867	78.4	78.3	75.3	S.	Raining	90.1	84.5	78.8	..	..	0.14		25
.840	83.3	83.0	77.4	S. W.	Ditto	.831	83.5	82.4	76.9	S.	Cirro-strati	.847	81.0	80.4	76.4	S. E.	Cirro-cumuli	86.0	81.5	77.0	..	..	0.78		26
.762	84.5	84.0	79.4	S. W.	Cloudy	.780	84.7	84.8	80.3	S. W.	Drizzly	.786	83.1	82.8	78.6	S.S.W	Cloudy	88.0	81.9	75.0	..	..	0.12		27
.693	89.0	87.5	79.9	W.N.W	Cumulo-strati	.696	88.2	87.0	80.3	W.N.W	Cumulo-strati	.699	86.0	85.2	80.3	W.	Cirro-strati	91.2	85.6	79.9	..	..	0.58	☾	28
.693	89.3	88.2	81.0	W.N.W	Ditto	.698	87.5	86.3	80.3	W.N.W	Ditto	.723	85.5	85.2	80.5	W.N.W	Ditto	90.3	84.3	78.2	..	..	0.08		29
.779	85.8	84.7	73.0	N. W.	Cirro-strati	.772	84.9	83.0	71.8	W.N.W	Cirro-strati	.788	82.2	80.4	74.4	W.N.W	Ditto	88.0	82.2	76.4	..	..	..		30
.835	87.3	86.7	72.3	WSW	Clear	.834	86.5	85.2	71.5	W.	Clear	.846	82.0	80.3	73.3	W.	Clear	89.0	80.1	71.2	..	..	..		31
29.830	86.8	85.8	77.9	....	.....	29.812	85.3	84.3	76.9	....	.....	29.825	82.8	82.0	77.2	....	.....	88.8	82.9	76.6	106.7	..	3.61		

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of October, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	..	..	..	..	....	.....	..	..	..	..	....	.....	29.911	89.0	89.0	82.0	S. W.	Cumulo-strati
2	..	..	..	..	....	.....	30.067	87.0	87.0	81.0	S. W.	Cumulo-strati	30.029	89.0	89.5	83.0	S. W.	Ditto
3	..	..	..	..	....	.....	.030	88.0	88.0	82.0	S.	Ditto	29.970	90.0	90.0	85.0	S. S. W.	Cloudy
4	..	..	..	..	....	.....	.035	89.0	88.0	82.0	S. S. W.	Ditto	.970	90.0	88.5	81.5	S. W..	Cirro-cumuli
5																		
6S																		
7	..	..	..	..	....	.....	..	..	..	..	....	.....	.795	91.8	91.0	..	N.	Cumulo-strati
8	..	..	..	..	....	.....	..	..	..	..	....	.....	.766	89.8	90.0	83.8	S.	Ditto
9	..	..	..	..	....	.....	..	..	..	..	....	.....	.778	91.0	91.0	..	S. W.	Ditto
10																		
..	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
14																		
15																		
16																		
17																		
18																		
19																		
20S																		
21	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
22	..	..	..	..	....	.....	30.067	82.0	81.6	77.3	N. E.	Cirro-cumuli	30.017	83.9	83.0	77.0	N. E.	Cloudy
23	30.019	75.3	75.5	73.6	N. E.	Cirro-cumuli	.047	83.8	83.0	76.2	N. E.	Ditto	29.982	87.8	86.6	79.0	E.	Cumulo-strati
24	29.927	76.2	76.7	75.3	N. E.	Ditto	29.960	84.9	84.9	79.4	N. E.	Cumulo-strati	.901	86.0	84.8	78.7	E.	Ditto
25	.906	77.8	78.8	77.3	N. E.	Scattered-clouds	.961	85.8	85.3	78.4	N. E.	Ditto	.905	88.5	87.3	78.7	N. E.	Ditto
26	.917	76.2	77.2	75.8	S. W.	Cirro-cumuli	.942	84.8	83.0	79.0	N.	Ditto	.906	81.6	80.8	77.8	W.N.W.	Cloudy
27S	.866	75.2	75.5	74.8	S.	Scattered-clouds	.905	83.8	83.8	79.3	S.	Ditto	.850	86.4	85.7	80.0	S. W.	Cumulo-strati
28	.795	78.6	79.5	78.4	S.	Cirro-cumuli	.825	86.0	85.4	79.6	W.	Ditto	.767	88.9	88.0	81.2	N. W.	Ditto
29	.794	78.0	78.2	77.1	W.S. W.	Raining	.822	79.8	80.3	78.0	W. S.W.	Cumuli	.769	87.0	87.0	82.0	W.N.W.	Cumuli
30	.825	76.2	76.5	72.0	N. W.	Cirro-strati	.860	84.5	84.2	73.0	N.	Cirro-strati	.830	87.6	86.3	72.2	N. W.	Cirro-strati
31	.912	71.0	71.4	69.0	N. W.	Ditto	.941	81.3	81.2	74.0	N. W.	Ditto	.895	86.0	85.3	71.9	W.N.W.	Ditto
Mean	29.885	76.1	76.6	74.8	....	.....	29.959	84.7	84.3	78.4	....	.....	29.885	87.9	87.3	80.3	....	.....

[*Meteorological Register, continued.*]

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's Phases	
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. Upper. 4.	Feet. Lower. 4.		Date.
nches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
9.722	85.2	84.0	80.3	S. E.	Cloudy	29,699	88.7	87.8	82.1	S. E.	Cumulo-strati	29.712	85.1	84.6	80.3	S. E.	Cumulo-strati	92.4	87.6	82.8	109.8	..	0.08		1
.735	86.8	85.6	80.2	S. E.	Ditto	.717	87.2	86.1	80.8	E.S.E.	Cloudy	.728	84.8	84.5	80.8	S. E.	Cloudy	92.3	86.6	80.8	106.5	..	..		2
.725	91.6	90.1	82.2	S. W.	Cumulo-strati	.695	90.6	89.8	81.2	S. W.	Cumulo-strati	.701	87.2	87.3	81.9	S. W.	Cirro-strati	93.8	87.5	81.2	110.0	..	..		3
.673	93.2	93.0	82.3	WSW	Ditto	.632	93.2	92.2	82.3	S. W.	Cirro-strati	.656	89.4	89.0	82.8	S.	Scatd. clouds	94.7	88.6	82.4	108.0	..	0.16		4
.653	93.3	93.0	84.5	WSW	Ditto	.647	91.6	90.9	84.0	S. W.	Cumulo-strati	.656	87.8	87.6	82.8	S.	Cloudy	95.0	89.3	83.6	113.0	..	0.08		5
.659	85.2	82.7	81.3	S. W.	Cloudy	.638	85.4	85.6	82.6	S. W.	Cirro-strati	.658	85.3	85.0	81.3	S.	Ditto	90.4	86.2	82.0	102.3	..	0.16	●	6
.575	90.0	89.8	82.5	S.S.W	Cirro-strati	.574	89.3	87.6	81.8	S. E.	Cloudy	..	..	..	..	..	.....	92.3	86.2	80.0	107.7	..	0.32		7
.559	91.0	89.6	82.7	S. W.	Cumulo-strati	.533	90.3	90.2	82.7	S.S.W	Cumulo-strati	.554	87.6	87.0	81.4	S.	Cumulo-strati	93.0	87.3	81.6	108.3	..	0.28		8
.612	86.3	85.2	81.2	S. E.	Cloudy	.598	85.7	84.5	81.0	S. E.	Cloudy	.616	84.1	84.2	81.4	S.	Cloudy	90.7	86.4	82.0	100.0	..	0.12		9
.562	84.0	83.2	81.2	S.	Ditto	.550	83.8	84.0	82.2	E.S.E.	Ditto	.551	84.6	84.3	82.0	S. E.	Ditto	90.4	86.0	81.6	101.0	..	1.12		10
.509	86.8	86.3	82.9	S.S.W	Ditto	.481	86.6	86.3	82.9	S.	Ditto	.499	85.2	85.0	82.1	WSW	Ditto	88.6	84.6	80.6	95.0	..	1.84		11
	86.3	85.8	82.9	NNW	Ditto	.481	84.3	83.8	81.7	N.	Raining	.476	83.0	83.0	81.0	NNE.	Ditto	86.8	84.3	81.7	..	..	0.25		12
	87.4	86.7	81.8	W.N.W	Ditto	.449	84.8	81.7	79.8	N. E.	Ditto	.456	80.6	81.0	79.4	S. W.	Ditto	88.0	83.5	78.7	98.0	..	4.68	D	13
.446	83.3	82.9	80.3	W.	Ditto	.450	82.3	82.9	80.2	W.	Cloudy	.480	82.2	82.4	80.0	WSW	Ditto	85.8	82.4	79.0	..	..	0.18		14
.615	90.3	90.2	82.8	S.	Cumuli	.616	89.4	88.5	81.2	S. W.	Cumuli	.647	87.6	87.2	81.4	S. W.	Cirro-strati	91.6	85.6	79.6	105.4	..	..		15
.651	90.0	87.9	82.3	N. E.	Cloudy	.630	89.2	88.0	81.3	N.NE.	Cirro-strati	.646	86.3	84.2	81.0	S.S.E.	Raining	92.5	86.0	79.5	109.4	..	0.06		16
.617	89.0	87.0	80.8	E.S.E.	Ditto	.603	88.3	88.0	82.7	S. E.	Ditto	.623	84.6	83.8	81.5	S.	Cloudy	91.4	86.2	81.0	110.9	..	0.20		17
.614	92.0	90.2	81.8	S.	Cumulo-strati	.595	90.3	87.4	80.7	E.	Ditto	.625	88.0	87.2	81.0	S.	Cirro-strati	93.7	87.3	80.9	109.6	..	0.08		18
.623	90.6	88.3	81.6	E.S.E.	Cloudy	.634	83.7	80.8	79.0	E.S.E.	Raining	.656	81.0	81.5	79.7	E.SE.	Scatd. clouds	91.0	86.0	81.0	107.0	..	3.24		19
.713	76.5	76.8	75.4	N. E.	Ditto	.705	77.0	77.0	75.5	N.	Cloudy	.731	76.6	76.9	75.7	N. E.	Cloudy	82.0	79.0	76.0	..	..	0.20		20
.675	87.0	86.2	80.0	E.	Cirro-strati	.673	86.0	84.3	76.4	E.	Cirro-strati	.689	81.8	81.2	75.8	N. E.	Cirro-strati	88.6	82.6	76.5	105.0	..	0.34	⊙	21
.644	79.9	79.2	77.0	N. E.	Cloudy	.625	78.7	78.3	77.2	N.NE.	Drizzly	.632	78.4	79.0	77.4	E.	Cloudy	83.0	79.7	76.4	90.0	..	2.82		22
.608	79.7	79.3	77.9	E.	Raining	.606	79.8	80.3	78.2	E.N.E.	Cloudy	.629	77.7	78.4	77.2	E.	Raining	84.5	80.7	76.8	..	..	2.00		23
.616	80.8	80.3	77.8	E.	Cloudy	.616	80.3	79.6	76.8	E.NE.	Ditto	.635	78.8	78.3	77.3	E.NE.	Drizzly	82.0	79.0	76.0	..	..	0.48		24
.634	81.0	80.3	78.6	E.	Drizzly	.638	79.5	79.3	78.2	E.	Raining	.680	78.9	79.4	77.9	E.S.E.	Raining	83.8	80.3	76.8	..	..	1.26		25
.812	78.8	78.6	75.8	S. E.	Cloudy	.799	79.4	79.2	75.8	S. E.	Cloudy	.828	79.0	78.8	76.6	S. E.	Scatd. clouds	85.5	81.3	77.0	..	..	0.10		26
.854	83.3	81.2	78.2	S.	Raining	.848	84.5	83.7	78.4	S.	Nimbi	.868	80.4	80.3	77.5	S.	Ditto	89.0	83.7	78.4	106.3	..	0.20		27
.851	82.6	81.3	78.4	S. E.	Drizzly	.841	80.3	79.8	77.3	S. E.	Scatter'd clouds	.844	79.2	79.6	77.8	S. W.	Ditto	88.7	83.1	77.4	106.8	..	0.24		28
.822	88.2	85.3	79.0	EN.E.	Cumulo-strati	..	..	..	..	....	.....	.848	78.3	78.0	76.0	N.	Raining	89.9	83.9	77.8	108.0	..	0.10	☾	29
.832	90.7	89.2	79.0	S. E.	Ditto	.800	90.0	87.8	78.3	E.S.E.	Clear	..	..	..	..	....	.....	91.2	83.6	76.0	109.0	..	..		30
9.651	86.4	85.3	80.4	....	.....	29,634	85.5	84.7	80 1	....	.....	29.654	83.0	82.8	79.7	....	.....	89.4	84.5	79.5	105.6	..	20,59		

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of September, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1S	29.756	82.3	82.8	81.0	S.	Cirro-cumuli	29.811	89.2	87.6	82.2	S. E.	Cirro-cumuli	29.762	91.0	89.0	82.2	E.	Cumulo-strati
2	.777	80.0	80.3	79.2	S. E.	Cirro-strati	.849	88.6	86.6	81.0	E. S. E.	Cumulo-strati	.795	92.2	90.2	83.0	E. S. E.	Ditto
3	.779	80.3	81.0	79.9	S. E.	Ditto	.837	89.1	87.4	81.3	S. W.	Ditto	.790	90.7	90.6	83.0	S. W.	Ditto
4	.748	81.6	82.5	80.8	S. S. W.	Clear	.784	90.0	89.5	81.7	S. W.	Cirro-strati	.763	91.6	90.3	82.0	S. W.	Ditto
5	.718	83.3	84.0	82.0	S. W.	Scattered-clouds	.792	85.2	83.6	78.7	N. W.	Cloudy	.728	89.6	89.9	82.7	S. W.	Cirro-strati
6	.732	81.4	82.3	80.9	N. E.	Cloudy	.755	88.7	86.3	82.2	S. E.	Ditto	.713	89.0	86.4	81.2	S. S. E.	Cloudy
7	.658	79 8	80.4	78.8	S. W.	Cirro-strati	.674	87.4	86.6	81.3	S. W.	Cumulo-strati	.639	90.7	90.4	82.9	S. W.	Cumulo-strati
8S	.614	81.0	81.6	80.0	S.	Ditto	.650	89.0	88.3	82.2	S. W.	Ditto	.616	91.8	90.4	82.8	S. W.	Ditto
9	.627	81.5	82.3	80.2	S. E.	Ditto	.674	88.8	86.2	81.5	S. E.	Cirro-strati	.662	87.3	83.3	81.1	S.	Raining
10	.636	81.3	82.0	80.4	E. S. E.	Cloudy	.660	87.2	85.8	82.2	S. S. E.	Cumulo-strati	.618	90.6	89.3	84.0	S. E.	Cumulo-strati
11	.569	81.4	82.3	81.2	S. E.	Ditto	.608	83.6	84.7	82.6	N. E.	Cloudy	.553	88.0	86.8	83.3	S. W.	Cloudy
12	.524	81.6	82 4	81.4	N. W.	Ditto	.574	82.2	82.7	81.5	N. E.	Raining	.536	83.2	83.4	81.9	N.N. W.	Drizzly
13	.518	79.0	80.0	78.8	N. W.	Ditto	.548	85.2	84.2	80.8	N.	Cloudy	.501	86.4	85.3	81.5	N. W.	Cloudy
14	.485	80.0	80.6	79.8	N. W.	Ditto	.525	82.4	82.6	80 8	W.	Ditto	.496	81.4	81.8	80.4	S. W.	Drizzly
15S	.619	79.6	80.2	79.3	S. E.	Ditto	.680	87.6	86.2	81.3	S.	Cumuli	.658	90.0	89.3	82.8	S.	Cumuli
16	.744	78.3	79.4	78.4	N. E.	Cirro-strati	.784	88.7	86.8	82.0	S. W.	Cumulo-strati	.734	91.5	90.0	81.3	S. S. E.	Cumulo-strati
17	.695	80.0	80.8	79.4	S. W.	Ditto	.733	87.3	85.2	81.5	E.	Ditto	.684	91 0	89.3	82.0	E. S. E.	Ditto
18	.658	80.3	81.0	79.3	S. S. E.	Ditto	.699	89.1	87.4	81.2	S. E.	Ditto	.678	90,8	88.7	81.4	S. E.	Ditto
19	.668	80,2	80.8	79.4	S. E.	Ditto	.732	89.2	87.6	81.8	E. S. E.	Ditto	.680	91.0	88,9	82.6	E. S. E.	Ditto
20	.715	80.5	81.0	79.4	E.	Cloudy	.779	76.0	76.8	75.8	E.	Raining	·774	75.7	76.2	75.2	E.	Raining
21	.741	76.3	76.9	76.0	N. N. E.	Ditto	.763	84.0	83.8	79.6	N. E.	Cumulo-strati	.722	85.7	84.3	78.8	N. E.	Scattered-clouds
22S	.723	76.0	76.3	75.0	N. E.	Ditto	.748	81.8	81.0	77.7	N. E.	Ditto	.706	82.2	82.4	78.8	N. E.	Cloudy
23	.661	76.4	76 8	76.2	E.	Raining	.692	78.8	79.6	78.0	E.	Cloudy	.664	83.5	83.4	79.3	E.	Ditto
24	.675	76.8	77 3	76.2	E.	Drizzly	.718	82.0	80.6	76.6	E.	Ditto	.681	81.9	80 9	77.0	E.	Ditto
25	.689	78.0	78.7	77.3	E.	Cloudy	.722	78.9	79.0	77.7	S. E.	Ditto	.690	79.4	80.0	78.1	E.	Drizzly
26	.822	78.0	79.0	77.7	E.	Nimbi	.875	82.4	81.8	78.3	S. E.	Ditto	.847	85 8	85.3	81.0	E. S. E.	Nimbi
27	.918	78.0	78.8	77.3	E.	Scattered-clouds.	.958	86.4	85.2	80.0	S. E.	Cumulo-strati	.920	85.2	82.7	78.4	E. S. E.	Cumulo-strati
28	.930	77.8	78.2	77.3	E. S. E.	Ditto	.964	84.5	84.0	80.0	S. E.	Ditto	.924	87.5	85.0	79.7	N. E.	Ditto
29S	.903	77.4	77 8	76.3	S. E.	Cloudy	.948	85.3	83.2	79.3	S. E.	Ditto	.889	88.8	87.8	80.0	S. E.	Ditto
30	.903	75.8	76.3	75.8	S. S. W.	Foggy	.935	85.4	83.8	79.0	S. S. W.	Ditto	.893	89.2	87.8	78.9	S. E.	Ditto
Mean	29.707	79.5	80.1	78.9	....	.....	29.749	85.4	84.5	80.4	....	.....	29.711	87.4	86.3	80.9	....	.....

[*Meteorological Register, continued.*]

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. Upper. 4.	Feet. Lower. 4.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.487	90.7	89.6	84.0	N.	Cloudy	29.443	91.2	90.2	84.0	N.	Cloudy	92.466	88.8	88.2	84.2	S.	Cloudy	91.9	88.1	84.2	100.0	..	0.24		1
.398	90.5	90.0	84.0	W.	Cumulo-strati	.377	90.2	89.4	83.3	W.	Nimbi	.414	83.2	83.0	80.0	WSW	Raining	92.0	86.5	81.0	109.0	..	5.04		2
.464	86.2	86.2	82.4	S.	Cloudy	.449	86.4	85.7	81.3	S.S.E.	Cloudy	.480	84.4	84.3	80.3	S.	Cirro-strati	88.3	84.2	80.0	100.0	..	0.08		3
.509	89.9	87.9	82.2	S. E.	Ditto	.490	90.4	88.0	82.4	S. E.	Ditto	.508	86.0	85.4	82.4	S. E.	Ditto	91.0	86.3	80.7	106.3	..	..		4
.450	88.0	86.3	81.8	WSW	Raining	.453	84.0	83.8	81.2	N.	Raining	.459	82.0	82.4	80.3	S.	Cloudy	92.2	87.5	82.7	108.5	..	0.76		5
.415	87.0	85.9	82.3	NNW	Nimbi	.386	90.0	89.6	83.7	N.W.	Cumulo-strati	.412	82.8	83.2	81.2	N. W.	Ditto	91.2	86.5	81.7	104.4	..	3.32		6
.451	80.4	80.7	78.8	sWsp.	Drizzly	.446	80.5	81.0	78.2	S. W.	Cloudy	.478	79.7	80.0	78.0	SW sp	Raining	81.5	80.4	79.3	..	..	0.50		7
.556	87.2	86.2	80.5	S. W.	Cumulo-strati	.543	87.3	87.2	81.5	S. W.	Cumulo-strati	.551	84.2	84.4	80.2	S. W.	Cirro-strati	88.7	84.4	80.0	98.0	..	..		8
.586	91.0	89.6	84.2	S.S.W	Ditto	.573	89.2	88.4	83.4	S.S.W	Cloudy	.591	82.0	82.3	80.2	S.	Raining	91.8	87.5	83.0	100.5	..	0.14		9
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	91.8	86.1	80.3	..	..	1.24		10
.645	85.6	84.8	81.8	S.S.W	Raining	.652	85.5	85.7	82.2	S.S.W	Cloudy	.684	79.3	79.8	78.2	S.S.W	Raining	89.5	85.9	82.2	..	..	0.36		11
.630	90.3	89.6	83.0	S.S.W	Cumulo-strati	.630	88.7	88.0	82.2	S.	Cirro-cumuli	.646	85.0	85.2	81.2	WSW	Ditto	91.2	84.8	78.3	103.8	..	0.08		12
.600	90.8	89.8	81.0	S. W.	Cirro-cumuli	.600	89.8	88.7	81.3	WSW	Cirro-strati	.587	86.2	86.0	81.6	S.	Cirro-strati	92.0	86.8	81.5	103.8	..	..		13
.620	92.4	91.8	82.7	S. W.	Cirro-strati	.593	91.8	91.0	81.8	S. W.	Cumuli	.629	82.2	81.9	78.3	S.S.W	Scatd. clouds	93.6	88.1	82.6	105.0	..	0.06	D	14
.603	90.0	89.2	83.2	S.S.W	Cloudy	.607	89.2	88.3	82.7	S. W.	Nimbi	.623	81.4	81.7	78.2	S.S.W	Drizzly	91.3	86.7	82.0	97.7	..	..		15
.614	90.0	89.2	82.7	S. W.	Ditto	.616	83.8	82.0	78.5	E.	Raining	.647	76.8	77.0	75.7	S. E.	Raining	91.0	86.5	81.9	98.0	..	1.62		16
.680	87.8	84.0	80.0	S.S.E.	Ditto	.676	83.0	82.2	79.2	S. W.	Cloudy	.705	81.0	80.7	78.0	S. W.	Cirro-strati	90.0	83.5	77.0	104.0	..	0.18		17
.733	88.5	88.0	82.0	E.	Nimbi	.718	86.4	85.3	81.0	S. E.	Cumulo-strati	.754	82.2	82.7	78.3	S. E.	Ditto	89.2	84.0	78.8	104.8	..	0.54		18
.801	86.2	85.0	79.2	S.	Cirro-strati	.775	83.5	81.3	78.3	S.	Cloudy	.794	83.2	82.8	78.8	S.	Ditto	88.0	83.2	78.3	98.6	..	0.22		19
.756	87.2	86.2	79.0	S. W.	Cloudy	.742	85.0	83.2	79.5	S. W.	Ditto	.752	82.0	82.3	80.4	S. W.	Ditto	90.8	84.9	79.0	104.0	..	0.10		20
.714	90.3	89.6	82.4	S. W.	Cumulo-strati	.688	90.0	88.9	82.1	S.S.W	Cumulo-strati	.705	86.2	86.0	81.0	S.	Ditto	91.3	86.2	81.0	106.7	..	..		21
.677	92.8	92.0	82.9	S. W.	Ditto	.659	92.2	91.2	84.4	S. W.	Ditto	.697	86.7	86.8	82.0	SW sp	Cloudy	93.7	88.0	82.3	109.0	..	..		22
.674	85.7	85.6	82.5	S. W.	Cloudy	.652	82.0	80.2	78.2	S.S.E.	Cloudy	.681	80.0	80.4	78.4	S.S.W	Ditto	97.0	83.8	80.5	..	..	..	⊙	23
.653	84.8	85.3	81.0	S.S.W	Cumulo-strati	.616	83.6	83.2	79.0	S.	Cumulo-strati	.623	84.5	84.7	81.0	S.	Cirro-strati	91.7	84.5	77.3	107.3	..	0.16		24
.630	91.3	90.0	82.0	S.S.W	Ditto	.613	88.0	87.0	81.8	S.	Cloudy	.621	85.2	85.2	80.8	S.S.W	Ditto	92.8	86.7	80.5	107.0	..	..		25
.701	81.0	79.8	78.2	S.	Raining	.682	79.0	79.0	77.7	S.	Ditto	.701	80.0	80.2	78.8	S. E.	Cloudy	90.5	85.0	79.4	102.0	.	0.24		26
.719	89.0	88.4	80.0	S.S.W	Cumuli	.702	88.7	87.2	80.3	S. W.	Cumulo-strati	.716	85.0	85.0	80.3	S. W.	Cirro-strati	90.4	85.0	79.6	106.8	..	..		27
.685	91.6	90.2	82.2	S. E.	Cumulo-strati	.655	89.0	86.6	81.0	S.	Cirro-strati	.654	86.0	85.7	81.3	S.	Ditto	92.2	86.4	80.6	105.2	..	..		28
.611	93.4	92.6	83.0	S.S.W	Ditto	.598	90.8	90.2	82.9	S. W.	Cumulo-strati	.601	86.4	86.4	82.3	S.	Clear	94.6	88.1	81.5	110.8	..	..		29
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	.....	..	..	..	..	..	..	☾	30
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	..		31
29.617	88.6	87.6	81.8	....	.....	29.594	87.1	86.2	81.2	....	.....	29.613	83.3	83.3	80.1	....	.....	90.8	85.7	80.6	104.0	..	14.88		

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of August, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.
		Of Mer.	Of Air.	W. Bulb.				Of Mer.	Of Air.	W. Bulb.				Of Mer.	Of Air.	W. Bulb.		
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.513	83.4	84.0	82.0	W.	Cirro-strati	29.564	89.8	88.5	83.4	W.	Cloudy	29.545	91.8	90.4	83.7	W.	Cloudy
2	.475	80.7	81.5	79.3	W.N.W.	Cloudy	.515	83.3	83.8	81.3	N. E.	Ditto	.482	87.2	85.2	81.3	E.	Ditto
3	.463	79.6	80.3	79.3	S. S. W.	Ditto	.516	82.0	83.2	80.8	S. S. W.	Ditto	.514	86.2	86.0	82.2	S. S. E.	Ditto
4S	.557	80.0	80.4	78.8	S. E.	Cirro-strati	.619	89.7	86.4	82.3	S. S. E.	Cumulo-strati	.564	90.5	88.0	81.7	S. S. E.	Cumulo-strati
5	.522	82.0	82.8	81.3	S. S. W.	Cloudy	.548	88.0	87.5	81.8	W.	Ditto	.510	91.6	90.0	81.8	W.N.W.	Ditto
6	.468	82.0	82.8	81.6	N. N. E.	Ditto	.497	88.5	88.0	83.0	N. N. E.	Cirro-strati	.486	90.2	89.2	82.3	N.N. W.	Nimbi
7	.430	79.2	80.0	79.2	S. W.	Raining	.477	79.2	80.0	78.5	s. w. shp.	Raining	.477	80.0	80.2	78.2	s.w. shp.	Raining
8	.553	80.0	80.7	77.0	S. W.	Cloudy	.614	85.2	85.0	79.8	S.	Cloudy	.599	85.2	85.2	80.0	s.w. shp.	Cirro-cumuli
9	..	..	..	..	....	.....	.662	87.2	87.0	82.6	S. W.	Cirro-strati	.641	90.2	89.8	83.9	S.	Cumuli
10	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
11	.672	81.2	82.0	80.0	S. W.	Cloudy	.728	84.0	83.8	80.3	S. W.	Cloudy	.701	87.4	87.3	81.8	S. W.	Cumulo-strati
12	.706	81.0	81.8	80.3	S. S. W.	Ditto	.737	84.2	84.0	80.2	S. S. W.	Ditto	.715	88.0	87.6	81.9	S. W.	Cirro-cumuli
13	.676	81.2	82.0	80.0	S. W.	Ditto	.712	86.0	85.5	80.3	S. W.	Ditto	.700	88.2	87.8	80.2	S. W.	Ditto
14	.649	81.8	82.6	80.6	S. W.	Cirro-strati	.706	88.6	88.4	82.0	S. W.	Cirro-strati	.679	90.9	90.2	82.1	S. W.	Cumuli
15	.680	82.3	83.0	80.7	S. W.	Cloudy	.713	87.0	87.3	82.8	S. W.	Ditto	.689	90.2	89.3	83.0	S. S. W.	Cloudy
16	.645	81.8	82.6	81.1	S. S. W.	Cirro-cumuli	.699	88.0	87.3	82.8	S. W.	Cumulo-strati	.669	90.2	89.3	83.3	S. W.	Cumulo-strati
17	.719	78.0	78.6	77.3	S. E.	Cloudy	.761	86.1	84.6	80.0	S. E.	Cirro-cumuli	.732	89.9	89.2	81.3	S. E.	Ditto
18S	.779	78.5	79.0	77.7	E. S. E.	Cirro-strati	.832	87.6	86.0	81.0	E.	Cumulo-strati	.800	88.0	86.4	81.2	E.	Ditto
19	.842	78.0	78.0	77.2	E.	Ditto	.886	83.0	80.0	77.5	S.	Raining	.868	84.6	80.2	78.6	S.	Raining
20	.824	78.8	79.0	78.2	S.	Clear	.858	87.3	86.7	81.0	S. W.	Cumulo-strati	.822	89.4	88.8	81.2	S. W.	Cumulo-strati
21	.777	80.0	80.7	79.0	S. S. W.	Cirro-cumuli	.835	85.1	84.2	80.2	S. W.	Ditto	.798	87.5	87.0	81.8	S. W.	Ditto
22	.736	81.8	82.2	79.8	S. W.	Cumuli	.780	88.0	87.2	80.8	S. W.	Cumuli	.756	90.3	90.0	82.5	S. W.	Ditto
23	.708	82.3	83.0	81.0	S. W.	Cloudy	.754	85.0	85.2	81.8	S. W.	Cloudy	.721	86.0	86.2	82.6	W.S. W.	Cloudy
24	.710	77.7	78.2	77.2	S. E.	Ditto	.727	88.4	86.3	81.6	S.	Cumulo-strati	.696	90.0	89.2	82.2	S. S. E.	Cumulo-strati
25S	.686	80.8	80.7	79.3	S.	Cirro-strati	.719	88.9	87.9	81.2	S.	Ditto	.686	91.3	90.3	83.0	S.	Ditto
26	.703	81.2	82.0	80.4	S.	Cloudy	.750	86.7	86.2	81.3	S. W.	Ditto	.716	90.0	89.2	81.8	S. W.	Ditto
27	.782	79.0	78.8	78.6	S. E.	Ditto	.811	84.6	84.7	80.3	S. W.	Ditto	.785	86.8	85.6	80.0	S. S. E.	Ditto
28	.745	79.9	80.4	79.2	S.	Cirro-strati	.780	88.0	87.3	81.6	S.	Ditto	.744	90.2	89.4	82.1	S. W.	Ditto
29	.701	81.3	81.8	80.3	S.	Ditto	.726	87.9	87.3	82.2	S. W.	Ditto	.686	90.8	89.4	82.7	S. W.	Ditto
30	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
31	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....
Mean	29.656	80.5	81.1	79.5	....	.....	29.697	86.3	85.7	81.2	....	.....	29.671	88.7	87.7	81.7	....	.....

[*Meteorological Register, continued.*]

Observations made at 2h. 40m						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. 40. Upper.	Feet. 4. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
9.475	80.0	81.3	78.8	ssw sp.	Cloudy	29.465	84.4	84.9	79.3	s.w.sp	Cloudy	29.507	83.4	84.3	78.9	SW sp	Scatd. clouds	85.6	81.7	77.8	91.0	..	0.40		1
.614	91.2	90.2	81.6	SWsp.	Cumulo-strati	.594	90.1	89.2	82.9	s.w.sp.	Cirro-strati	.635	85.4	85.8	81.3	SW sp	Cloudy to the W	92 8	87.4	81.9	104.0	..	0 29		2
.600	90.6	90 2	81.4	S. W.	Cirro-strati	.566	90.3	89.5	83.7	S.	Ditto	.588	86.6	87.0	82.9	S.	Cirro-strati	92.4	86.1	79.8	105 8	..	0.24		3
.552	90.3	89.4	83.2	S.	Ditto	.519	88.3	88.0	82.6	S. W.	Cloudy	.534	87.7	87.0	82.2	S.	Zenith-clear	91.6	86.7	81.8	100.2	..	0 12		4
.539	88 3	87.8	82.8	S. shp.	Cloudy	.520	87.7	87.5	82.6	S. sp.	Ditto	.528	85.4	86.0	82.6	S.SW.	Cloudy	89.7	85.5	81.3	..	..	..		5
.493	95.7	94.3	84.6	S.	Cirro-strati	.501	94.3	93.3	84.5	SS.W.	Cirro-strati	.496	90.0	89.7	84.9	S.SW.	Cirro-strati	96.7	89.8	82.9	105.6	..	..		6
.550	96.4	94.3	85.8	S.	Ditto	.527	94 5	94 0	86.0	S.	Ditto	.541	90 8	89.7	82.8	S. E.	Ditto	97.4	91.2	85.0	112.9	..	..		7
.635	82.0	82.0	78.1	S. E.	Cloudy	.601	79.0	78.7	76.0	S.	Raining	.578	79 4	79.8	75.9	S.	Cloudy	96.0	87.5	84.0	110.0	..	0.14		8
.565	95.7	94.3	35.0	S. W.	Cumuli	.512	94.0	92 5	86.3	S.	Cloudy	.563	87.3	86 8	80.2	S.	Ditto	96.6	88.0	79.3	112.3	..	..	●	9
.565	95.3	91.9	85.2	S.	Cirro-strati	.529	92.3	91.2	83.8	S.	Cirro-cumuli	.535	88.9	88.4	81.3	SS.W.	Cirro-strati	94.6	89.0	83 4	109.7	..	..		10
..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	.....	95.0	89.7	84 3	..	..	..		11
..	94 0	93.2	83.3	S. W.	Cumuli	.525	93.0	92.0	82.7	S. W.	Cirro-strati	.538	87.3	86 9	80.9	S. W.	Cirro-strati	95.0	89 3	83.6	107.0	..	..		12
..	94.0	92.9	84.5	S. W.	Cumulo-strati	.485	92.7	91.3	83.7	S. W.	Ditto	.493	88 2	88.0	82.8	SS.W.	Ditto	95.0	89.3	83.6	105.7	..	..		13
.510	94 3	89.3	83.3	N.	Cloudy	.536	79.5	78.8	77.0	NNW	Raining	.551	78.0	77.9	76 3	S. E.	Raining	96.5	87.3	78 0	107.7	..	1.20		14
.499	93.9	92.2	83.7	S. W.	Cumulo-strati	.486	90 6	89 6	83.2	SS.W.	Cloudy	.489	82.0	82.0	79.6	N. E.	Cloudy	94.2	85.6	77.0	112.7	..	0.08		15
.521	91.6	89.5	81.2	S. E.	Ditto	.499	90.6	88 2	81.4	S. E.	Ditto	.529	86.2	86.0	79.8	S. E.	Scatd. clouds	92.9	87.2	81.5	106.5	..	0.42	☽	16
.565	85.4	80.8	79.3	S. E.	Raining	.544	86.7	86.7	81.9	S. E.	Cumulo-strati	.565	85.0	84.2	79.7	S. E.	Cumulo-strati	88.3	84.4	80 4	104.3	..	0.69		17
.567	90.5	88.8	82.3	S. E.	Nimbi	.558	87.5	87.3	83.2	S.	Ditto	.587	85.4	85.0	79 6	S.	Cirro-strati	90.0	85.2	80.3	107.8	..	0.38		18
..	..	..	..	.....	.....	..	..	..	..	....	.....	..	..	..	..	..	.....	90.4	85.8	81.2	..	..	..		19
.522	85 2	82.3	79.8	N.	Rain & thunder	.508	80.0	82.0	80.0	S. E.	Raining	.535	79.2	79.7	77.9	N. W.	Raining	94.9	88 0	81.0	110 0	..	3.32		20
.481	92.8	92.2	84.5	S.	Cumulo-strati	.472	90.6	89 8	81.9	S.S.W	Cloudy	.483	87.9	87.4	83.0	S. W.	Cloudy	93.8	86 8	79.8	108 0	..	..		21
.423	96.2	94 8	83 3	E.S.E.	Ditto	.403	93.3	86.5	82 4	S. E.	Raining	.439	84 3	84.5	82.0	SS.W.	Scatd. clouds	96.9	90.1	83.2	114.8	..	0.42		22
.408	86 9	81.8	79.6	W.	Rain & thunder	.381	83 0	82.2	80.4	E.	Ditto	.396	82 9	83.2	80 3	S. E.	Cloudy	90.9	86.3	81 6	103.0	..	0 92		23
.375	89 3	86.8	80.9	S. E.	Cumulo-strati	.356	88.2	84.9	81.9	S. E.	Cumulo-strati	.398	83 0	81 8	80.0	S. E.	Raining	90.2	85.4	80.6	103.5	..	1.04	⊙	24
.494	82.2	81.9	79.3	S. E.	Cloudy	.479	81.2	80.9	78.9	S.	Cloudy	.515	80.0	80.2	78.4	S.	Cloudy	82.2	80.8	79.3	..	..	0.64		25
.516	84.0	83.0	80.7	S.S.E.	Drizzly	.490	83.2	83.2	81 0	S.S.E	Ditto	.517	84.0	84.2	81.2	S.	Scatd. clouds	86.2	82 6	79 0	95 0	..	2.00		26
.482	86.2	84 7	80.6	N. E.	Cumulo-strati	.459	85.2	84.8	80 2	N. E.	Ditto	.489	83.4	83.7	79.2	E.	Ditto	90.0	83.9	77 8	99.6	..	2.50		27
.478	87.7	86 0	81.9	S.	Ditto	.474	88 0	85.9	81 2	S.	Cumulo-strati	.511	83.8	83.6	80 3	S.	Cloudy	88.8	83.4	78.0	105.0	..	..		28
.542	93.2	92.7	84.2	S.	Ditto	.508	93.0	90 3	82.7	S.	Cloudy	.533	87 2	87.2	83 0	S. E.	Scatd. clouds	95.6	88 5	81.3	114.8	..	..		29
.510	95.0	91.9	83.0	E.	Ditto	.489	93.0	91.4	83.0	E.	Nimbi	.513	88 0	87.6	84 3	S. E.	Cloudy	96.3	89 6	82 8	115.4	..	0.54		30
.492	95.4	94.5	84.0	E.	Ditto	.474	95.5	93 5	83.2	S. E.	Cumuli	.471	91.0	89.0	84 0	NNW	Cumuli	96.3	89.8	83.2	115.7	..	..		31
29.51	90.4	89.8	82 3	..	.....	29.499	88.7	87.5	82.0	....	.....	29.519	85.2	85.1	80.9	....	.....	92.7	86.9	81.2	106.6	..	15.34		

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of July, 1850.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at apparent noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.396	77.4	77.9	76.4	S. S. W.	Drizzly	29.458	83.2	82 8	78.7	S. W.	Cloudy	29.469	83.5	84.0	79.1	S. sharp	Cloudy
2	.613	81.4	82 8	80.3	S.	Cirro-strati	.654	88.8	88.2	82,2	S. sharp	Cumulo-strati	.949	89.3	89 8	82,9	s.w. shp.	Cumulo-strati
3	.659	81.4	82,2	80,2	S. W.	Ditto	.689	89 3	89.2	83.7	S. W.	Cirro-strati	.654	89 8	89,3	82 3	W.	Cirro-strati
4	.589	81.9	82 2	79.8	S. W.	Ditto	.633	86.7	86.5	82.4	S. W.	Ditto	.604	89.7	89.0	83.2	S. W.	Ditto
5	.565	82,9	83.5	71.0	W.	Cloudy	.579	82 4	82 8	79.0	S.	Cloudy	.569	87.8	87 2	82,2	S. S. W.	Cloudy
6	.513	82,2	83.0	81.0	S. S. W.	Ditto	.560	90.0	90.0	83 2	S. S W.	Cirro-strati	.549	94 0	93.4	85,2	S. W.	Cirro-strati
7S	.522	84.3	85 0	82,8	S. S W.	Cirro-strati	.590	92.3	91.3	84.9	W.S. W.	Ditto	.580	96,2	95.2	84.5	W.	Ditto
8	.599	83.3	84.0	82.2	S.	Scattered-clouds	.641	92,4	91.2	86 0	S.	Ditto	.627	93,2	86.7	81 2	N. E.	Cloudy
9	.596	79 8	80,3	78.3	S.	Cloudy	.626	90 5	89.3	84.0	S. W.	Cumuli	.591	94,8	93.7	86,2	S. W.	Cumuli
10	.597	83.3	84.0	82.0	S. W.	Scattered-clouds.	.624	89.0	88.4	83.4	S. S. W.	Cirro-strati	.595	91.2	90,1	83.2	W. S.	Cirro-strati
11	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	....	....
12	.611	83.2	83.7	81.3	S. W.	Cirro-strati	.621	90,2	89.2	82 3	S. S. W.	Cumulo-strati	.614	92.8	91.8	82.6	S.	Cumulo-strati
13	.538	82,5	83.0	81.0	S. W.	Ditto	.585	89.0	88.5	82,3	S. W.	Ditto	.559	92.6	91.3	82.6	S. W.	Ditto
14S	.516	82.8	83.3	81.3	S.	Ditto	.552	92 3	91.3	84 3	S.	Cirro-strati	.525	94 8	93.3	86.0	S.	Cumuli
15	.565	78.3	78.8	77.8	S. E.	Cloudy	.583	88 4	86.8	82.2	W.	Cumulo-strati	.557	90,5	89.0	82.4	S. W.	Cumulo-strati
16	.560	81 0	81 8	80.2	S.	Ditto	.597	91.9	89 0	82.9	E. N. E.	Ditto	.562	93.4	89.8	82,4	S. S. E.	Cloudy
17	.582	81.0	81.7	79,8	E. S. E.	Scattered-clouds.	.617	88.2	85 3	81 7	E. S. E.	Nimbi	.615	83 1	80.8	78.4	S. E.	Raining
18	.620	80 0	80.5	79 0	E. S. E.	Cirro-strati	.655	86.8	85 3	81.8	S. E.	Cumulo-strati	.621	88.9	87.0	81.3	S.	Nimbi
19	..	..	..	..	....	.....	..	..	..	..	....	.....	..	..	..	..	..	....
20	.598	80 8	81.0	79.4	S.	Cirro-strati	.614	90,2	89.4	82.3	S.	Cumuli	.589	92 9	92.2	83.8	S. W.	Cumulo-strati
21S	.526	81.5	82,0	80,3	S.	Ditto	.571	88.7	88.2	83.0	S. W.	Cirro-strati	.546	91.2	90.5	83 5	S.	Ditto
22	.494	82.3	83 0	81.3	S.	Cloudy	.515	91,8	90,7	84 7	E. S. E.	Cumulo-strati	.485	93.0	91.8	84 9	E. S. E.	Ditto
23	.471	80 9	81 3	79.6	E. N. E.	Ditto	.469	87.0	86,2	81.2	E. N. E.	Cloudy	.448	88 6	85.0	82 0	E. S. E.	Nimbi
24	.435	80.2	80 3	78.3	E. sharp,	Ditto	.457	86.2	84.9	80.2	E.	Ditto	.422	88.9	88.0	81.8	E.	Cloudy
25	.467	79.3	79.6	78 3	S. E.	Raining	.477	79.4	80 0	79.0	N.N. W.	Raining	.515	80.8	80.5	78 8	S.	Raining
26	.535	78.7	78 8	78 0	N. E.	Ditto	.599	82.2	81.3	79.2	E.	Cloudy	.552	85.3	83.6	80.2	S. E.	Cloudy
27	.520	77.5	78.0	77.0	E.	Cloudy	.575	84 4	83 6	79 5	E. N. E.	Cumulo-strati	.523	89.2	87.6	81.8	E. N. E.	Cumulo-strati
28S	.507	77 7	78.2	77.3	N. E.	Raining	.531	80.2	80.7	79.4	N. N. E.	Raining	.501	85.7	84.0	81.3	N. N. E.	Cloudy
29	.601	80,6	81.2	80 2	S. S. E.	Cloudy	.613	88.2	87.2	83.0	S.	Cumulo-strati	.600	91.2	90.5	83.9	S.	Cumulo-strati
30	.578	82.0	82.8	81.6	S. E.	Cumulo-strati	.589	91.5	88.8	83.8	S. S. E.	Ditto	.559	93.7	91.7	83 8	S. E.	Ditto
31	.566	82.4	83.0	81.8	S. E.	Cirro-strati	.583	90 3	89.2	84.0	N. E.	Ditto	.543	93,2	91.7	84.3	N. E.	Ditto
Mean	29.550	81.1	81.6	79.9	....	.....	29.581	88.0	87.1	82.2	....	.....	29.559	90.3	88.9	82.6	....	....